LOOKING FOR MAPS, NETWORKING EVENTS, OR COMMITTEE MEETINGS? See the Conference Guide in your registration bag.
This program is divided into two sections. The opening Program-at-a-Glance pages present an overview of the technical symposia and sessions planned for TMS2019. The full Technical Program, beginning on page 105, provides more complete program details, including paper titles, author names, and presentation times. Technical presentation information is also available through the TMS2019 App or can be downloaded as a PDF from www.tms.org/TMS2019.

NOTICE REGARDING TECHNICAL PROGRAM CANCELLATIONS
Changing the times of presentations is disruptive to the program and may cause delegates to miss valuable presentations. We have asked symposium organizers and session chairs not to adjust presentation times in the event that a speaker is unable to deliver his or her talk due to international travel and/or visa issues resulting in late cancellation or “no show.”
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NOTICE REGARDING
TECHNICAL PROGRAM CANCELLATIONS

Changing the times of presentations is disruptive to the program and may cause delegates to miss valuable presentations. We have asked symposium organizers and session chairs not to adjust presentation times in the event that a speaker is unable to deliver his or her talk due to international travel and/or visa issues resulting in late cancellation or “no show.”
### MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Simulation of High Temperature Processes

**Sponsored by:** TMS: Pyrometallurgy Committee

**Program Organizers:** Tao Jiang, Central South University; Jian-Yang Huang, Michigan Technological University; Dean Gregurek, RHI Magnezita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yuce, Istanbul Technical University; Ender Keskinkilic, Atılım University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

**Monday AM | March 11, 2019**

**Session Chairs:** Dean Gregurek, RHI AG Technology Center; Leoben; Rafael Padilla, University of Concepcion

**Session Chairs:**

- **9:00 AM Introductory Comments**
- **9:05 AM**
  - A Mathematical Model for Carbon Loss of Blast Furnace Based on Traditional Engineering Method: *Shun Yao*¹; Shengli Wu¹; Bo Song¹; Mingjin Kou¹; Heng Zhou¹; ¹University of Science and Technology Beijing
- **9:25 AM**
  - Study on Alkali Circulation Process and Its Influence on Coke Ratio in Blast Furnace: *Haokun Li²; Yijie Wang¹; Kexin Jiao²; Jianliang Zhang¹; Rong Zhu¹; Hanjie Guo¹; ¹University of Science and Technology Beijing
- **9:45 AM**
  - Break
- **10:05 AM**
  - The Pyrolysis of Methane and Carbon-steam Reaction in Copper Fire Refining: *Paul Mather³; Matthew Krane¹; ³Purdue University*
- **10:25 AM**
  - Fuzzy Grey Relational Analysis for Electromagnetic Parameters of Induction Heating Process: *Pei Fu¹; Ping Zhou¹; Tian Yang Zhao¹; Chenn Zhou¹; Zhe Chen¹; ¹Central South University; ²Purdue University Calumet
- **10:45 AM**
  - Submerged Gas Injection Physical and CFD Modelling and Visualisation: *Kenneth Kaiser¹; Mostafa Smadzadeh²; Leili Tafaghodi²; ¹Air Liquide Inc; ²University of British Columbia*
- **11:05 AM**
  - Modelling of Motion and Heat Transfer of Blast Furnace Dust Particle during Flash Reduction Process at High Temperature: *Jin Xu¹; Nan Wang¹; Min Chen¹; ¹Northeastern University*
- **11:25 AM**
  - Numerical Simulation of Inclusion Removal in a Novel Tundish with Swirl Flow: *Jianchuan Yan¹; Tao Li¹; Jun Liu¹; ¹ChongQing University*
- **11:45 AM**
  - Numerical Simulation Study on Design Optimization of Inner Cavity Dimensions of Large Capacity Tundish: *Yong Zhong¹; Mingmei Zhu¹; Bing Huang¹; ¹ChongQing University*
- **12:05 PM**
  - Concluding Comments

### ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Energy and Material Production

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division. TMS: Energy Committee

**Program Organizers:** Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, Csiro; John Howarter, Purdue University; Neale Neelameggham; IND LLC

**Monday AM | March 11, 2019**

**Session Chair:** To Be Announced

**8:00 AM**

- Effect of Dust in Flue Gas on Heat Transfer Efficiency: *Jiapeng Liang¹; Haibin Zuo¹; Jingsong Wang¹; Yingli Liu¹; Wanlong Zhang¹; Shenhui Liu¹; ¹University of Science and Technology Beijing*

**8:20 AM**

- Analysis on Energy Efficiency and Optimization of Hlsmelt Process: *Chaozhen Cao¹; Yujie Meng¹; Fangxing Yan¹; Dianwei Zhang²; Xin Li³; Fuming Zhang¹; ¹Beijing Shougang International Engineering Technology Co., Ltd.; ²Shougang Research Institute of Technology*

**8:40 AM**

- Construction on Energy Flow Network of Modern Blast Furnace Ironmaking: *Fuming Zhang¹; ¹Shougang Group*

**9:00 AM**

- Feasibility of a District Heating System in Fjardabyggd Using Waste Heat from Alcoa Fjardal: *LeÓ Haraldsson¹; Maria Gudjonsdottir¹; Gestur Valgardsson¹; Gudrun Saevsdottir¹; ¹Reykjavik University; ²EFLA Consulting Engineers*

**9:20 AM**

- Break

**9:40 AM**

- Phase Equilibria and Thermodynamics in the FeSO4–CaSO4 System: *Fiseha Tesfaye¹; In-Ho Jung¹; Mykola Moroz²; Daniel Lindberg³; Leena Hupa³; ¹Åbo Akademi University; ²Seoul National University; ³Aalto University*

**10:00 AM**

- Research and Application on Waste Heat Recycling and Preheating Technology of Ironmaking Hot Blast Stove In China: *Xin Li³; Fuming Zhang¹; Guangyu Yin¹; Chaozhen Cao¹; ¹Beijing Shougang International Engineering Technology Co., Ltd.; ²Shougang Group*
SPECIAL TOPICS

2019 EPD Distinguished Lecture — Distinguished Lecture

Sponsored by: TMS Extraction and Processing Division

Program Organizer: Cynthia Belt, Metals Energy Management LLC

Monday AM | March 11, 2019
213B | Henry B. Gonzalez Convention Center

Session Chair: Cynthia Belt, Metals Energy Management LLC

8:00 AM Introductory Comments

8:05 AM
The Importance of Transient Phenomena in Metallurgical Processes: Sridhar Seetharaman; 1Colorado School of Mines

8:45 AM Question and Answer Period

8:55 AM Break

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Electrometallurgy

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Monday AM | March 11, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chair: Cong Wang, Northeastern University

9:00 AM Introductory Comments

9:10 AM Invited
Theoretical and Experimental Probing of the Molten State: Antoine Allanore; 1MIT - DMSE

9:40 AM Break

10:00 AM Invited
The Utility of Liquid Metals in Electrometallurgical Processing of Used Nuclear Fuels for Recycling: Hojong Kim; 1Pennsylvania State University

10:30 AM Invited
Dissolution Behavior of Solid SiO2 in CaCl2-based Molten Salts: Xiaoyang; Kouji Yasuda; Toshiyuki Nohira; Fumitaka Tsukihashi; 1The University of Tokyo; 2Kyoto University

LIGHT METALS

2019 Light Metals Keynote Session — Aluminum Industry: Vision for the Next Decade

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Olivier Martin, Rio Tinto

Monday AM | March 11, 2019
004 | Henry B. Gonzalez Convention Center

Session Chair: Olivier Martin, Rio Tinto

8:00 AM Introductory Comments

8:05 AM Keynote
The Aluminium Story: Chris Bayliss; 1International Aluminium Institute

8:35 AM Keynote
China Aluminium Industry Picture: Mo Xinda; 1China Nonferrous Metals Industry Association

9:05 AM Keynote
Products of the Future - Solutions for Shaping a Sustainable World: Todd Summe; 1Novelis Inc.

9:35 AM Break

9:55 AM Keynote
Smelter of the Future: Hans Erik Vatne; 1Norsk Hydro ASA

10:25 AM Keynote
The Aluminium Industry Revolution at the Door Step: Vincent Christ; 1Elysis

10:55 AM Panel Discussion
Monday AM | March 11, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Pei Dong, George Mason University

Session Chair: Surojit Gupta, University of North Dakota

8:00 AM Invited
Materials Design for Energy and Sustainability: Lan LP; ‘Boise State University

8:25 AM
The Improvement in Conversion Efficiency of Phthalocyanine-based Organic Photovoltaics: Miroslav Popovic; Stevan Davidovich; Barney Simic-Gravasik; ‘University of California Berkeley

8:45 AM
Design of Novel Polymer Matrix Composites: Surojit Gupta; Maharshi Dey; Sabah Javaid; Kathryn Hall; ‘University of North Dakota

9:05 AM
Comparison of Solar Selective Absorbance Properties of TiN, TiNxOy and TiO2 Thin Films: Hanan Abd El-Fattah; Shall_el Mofattah; Mostafa Shazly; Walid Khalifa; ‘Cairo University; ‘Cairo University/ Adjunct The British University in Egypt; ‘The British University in Egypt

9:25 AM
Carrier Separation in High-efficient Kesterite Thin-film Solar Cells Probed by Optical and Scanning Probe Investigation: Juran Kim; William Jo; Kee-Jeong Yang; Dae-Hwan Kim; Jin-Kyu Kang; ‘Ewha Womans University; ‘Daegu Gyeongbuk Institute of Science & Technology (DGIST)

9:45 AM Invited
Nanomaterials — Nanomaterials for Energy and Sustainability and Energy Harvesting

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday AM | March 11, 2019
225A | Henry B. Gonzalez Convention Center

Session Chair: Surojit Gupta, University of North Dakota

8:00 AM Invited
Study for Stable and Flexible Perovskite Solar Cells: Jung-Kun Lee; ‘University of Pittsburgh

8:30 AM Invited
Direct Characterization of Molecular Ordering in Organic Semiconductors: How the Nanoscale Structure Defines Electronic and Photovoltaic Properties: Gabriel Calderon; Jared Johnson; Menglin Zhu; Jinwoo Hwang; ‘Ohio State University

9:00 AM
A Flexible Solar Cell/supercapacitor Integrated Energy Device: Pei Dong; Jun Lou; ‘George Mason University; ‘Rice University

9:20 AM
A New Class of Integrated Chalcogenide Nanocrystals and Thin Films for Solar Cell Applications: Soubantiha Patchoudhury; Abdollah Arabshahi; Uday Garge; Armel Bouchet; Yasin Foster; Deli Zimmermann; Hamad Alresheedi; ‘University of Tennessee Chattanooga

9:40 AM Break

9:50 AM Invited
Cobalt Oxide Electrode Catalysts Doped with Various Transition Metals for Enhanced Oxygen Evolution Reaction: Changsoo Lee; Chanwon Jung; Pyuc-Pa Choi; Hyuck Mo Lee; ‘KAIST

10:20 AM Invited

10:50 AM
Synthesis of Hybrid Nanocomposites of Nanostructured Co3O4 interfaced with Reduced/nitrogen-doped Graphene Oxides for Selective Enhancements in Electrocatalytic and/or Supercapacitive Properties: Erick Ribeiro; Sheng Hu; Dibyendu Mukherjee; Bamin Khomami; ‘University of Tennessee Knoxville

11:10 AM
Gold Flower-like Structures: Excellent Candidates as Sensors: Karine Mougin; Delphine Faye; Vincent Vignat; Arnaud Buch; ‘Institut De Science Des Matériaux De Mulhouse; ‘CNES; ‘ICB; ‘CentraleSupelec

11:30 AM
Core/shell Nanoparticles via Inert Gas Condensation: Jeffrey Shield; Zahra Ahmadi; ‘University of Nebraska
ADDITIVE TECHNOLOGIES


Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kestler Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee S. Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Monday AM | March 11, 2019
221A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology

8:00 AM Invited
Considerations in the Penetration of Additive-produced Materials into Mainstream Production of Commercial, Industrial, and Defense Products – Metallurgy, Capability, and Overcoming Adversity; Eric Ott1; Amber Andreacchio1; David Abbott1; Behrang Poorganji1; GE Additive

8:30 AM Invited
Application of ICME Tools and Methods to Additive Manufacturing Process Development and Component Qualification: David Furrer1; Rebecca Runkle1; Sergei Burlatsky1; Pratt & Whitney; United Technologies Research Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

9:00 AM
Development of a Computational Model of Metal Additive Manufacturing: Vu Nguyen1; Anthony Murphy1; Gary Delaney1; Peter Cook1; Sharen Cummins1; Paul Cleary1; Patrick O’Toole1; Dayalan Gunasegaram1; Matthew Sinnott1; CSIRO

9:20 AM
Computational Modeling for Additive Manufacturing of Engine Components: Terry Wallace1; Christopher Lang1; Kevin Wheelen1; Joshua Fody1; NASA Langley Research Center; NASA Ames Research Center

9:40 AM Break

10:00 AM Invited
Modeling Process–structure–process Relationships in Additively Manufactured Alloys with Machine Learning and Materials Informatics: Branden Kappes1; Senthamilaravui Moorthy1; Henry Geerlings2; Nathan Johnson1; Thomas Gallmeyer1; Behnam Amini-Ahmadi1; Rui Liu1; Xiaoli Zhang1; Bryce Meredith1; Aaron Stebner1; Colorado School of Mines; CoorsTek; Carnegie Mellon University; Citrine Informatics

10:30 AM
Development of a Microstructural-based Computational Model for Predicting the Mechanical Properties of Metals Manufactured by Additive Manufacturing: Mohsen Taheri Andani1; Mohammad Reza Karamoz-Ravari1; Mohammad Ghodrati1; Reza Mirzaeifar1; Jun Ni1; University of Michigan; Graduate University of Advanced Technology; Virginia Tech

10:50 AM
Geometry and Size Effect in Metal Additive Manufacturing and Relevant Processing Parameters Optimization: Jinquan Cheng1; Composite Solutions and Digital Manuf

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Nuclear Components and Instrumentation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Monday AM | March 11, 2019
223 | Henry B. Gonzalez Convention Center

Session Chair: Isabella van Rooyen, Idaho National Laboratory

8:00 AM Invited
Westinghouse Advanced Manufacturing Development: Clinton Armstrong1; Westinghouse Electric Company

8:30 AM
Additive Manufacturing of Steels for Advanced Reactor Concepts: Niyanth Sridharan1; Thersa Mary Green1; Frank Chen1; Kevin Field1; Oak Ridge National Laboratory; University of Wisconsin Madison

8:50 AM
Additive Manufacturing of Advanced Fuel Components for Commercial Reactors: David Huegel1; Paula Freyer1; Bill Cleary1; Craig Amick1; Zeses Karoutas1; Clinton Armstrong1; Peng Xu1; Westinghouse Electric Company

9:10 AM Invited
Additive Manufacturing of Instrumentation for Measuring Field Properties in Extreme Environments: David Estrada1; Boise State University

9:40 AM Break

10:00 AM
Additive Manufacturing for In-pile Instrumentation in Nuclear Test Reactors: Michael McMurtrey1; Troy Unruh1; Harish Subbaraman1; Eric Jankowski1; Lan Li1; David Estrada1; Idaho National Laboratory; Boise State University

10:20 AM
Embedded Fiber Optic Sensors for In-core and In-pile Applications Enabled by Ultrastronic Additive Manufacturing: Christian Petrie1; Niyanth Sridharan1; Adam Hehr1; Mark Norfolk1; John Sheridan1; Sudarsanam Babu1; Oak Ridge National Laboratory; Fabrisonic LLC; Sheridan Solutions LLC; University of Tennessee
### ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — High Temperature Materials

**Sponsored by:** TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanan Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

**Monday AM | March 11, 2019**

#### 221C | Henry B. Gonzalez Convention Center

**Session Chairs:** Bij-Na Kim, LPW Carpenter Additive; Katerina Christofidou, University of Cambridge

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**8:00 AM Introductory Comments**

**8:05 AM Invited**

**Advanced Alloy Design Tailored to Accommodate Additive Manufacturing Rapid Solidification:** Emma White; Timothy Prost; Ralph Napolitano; Iver Anderson; Iowa State University/Ames Laboratory

**8:35 AM**

An Integrated Computational Materials Engineering (ICME) Framework for AM718Plus Post Processes: Qiaofu Zhang; Jiadong Gong; Greg Olson; QuesTek Innovations LLC

**8:55 AM**

Microstructural Optimization and Mechanical Property Response of DMLM Rene 65: Andrew Wessman; Laura Dial; Timothy Hanlon; GE Additive; GE Global Research

**9:15 AM**

Microstructural Evolution of Additively Manufactured Co-base Layer on Austenitic Stainless Steel: Jinsung Jang; Min Ha Shin; Chang Hee Han; Do-Hyang Kim; Junhyun Kwon; Korea Atomic Energy Research Institute; Yonsei University

**9:35 AM Break**

**9:55 AM Invited**

**Microstructure Evaluation During Additive Manufacturing of Niobium Silicide-based Alloys:** Hongbiao Dong; University of Leicester

**10:25 AM**

Modeling Residual Stress and Phase Evolution as a Function of Additive Manufacturing Process Parameters: Cornelia Altenbuchner; Richard Otis; Andrew Shapiro; Jet Propulsion Laboratory

**10:45 AM**

In Situ Microstructure Evolution Characterization of Additive Manufactured U6Nb Under Load: Eloisa Zepeda-Alarcon; Amanda Wu; Bjorn Clausen; Donald Brown; Los Alamos National Laboratory; Lawrence Livermore National Laboratory

**11:05 AM**

In Situ and Time-resolved Diffraction Studies to Reveal Microstructural Transformations and Changes upon Heat Treatment: Klaus-Dieter Liss; Guangdong Technion - Israel Institute of Technology (GITIIT)

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### ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Fundamentals in Alloy Design for AM I

**Sponsored by:** TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

**Monday AM | March 11, 2019**

#### 221D | Henry B. Gonzalez Convention Center

**Session Chairs:** Behrang Poorganji, GE Additive; James Saal, Citrine Informatics

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**8:00 AM Introductory Comments**

**8:05 AM Invited**

Genomic Materials Design: Alloys for Additive Manufacturing: Greg Olson; Northwestern University & QuesTek Innovations LLC

**8:35 AM**

Development of Alloys for Additive Manufacturing using the Materials by Design® Methodology: Martin Walbrüch; Ida Berglund; Greta Lindwall; QuesTek Europe AB; QuesTek Innovations LLC; KTH Royal Institute of Technology

**8:55 AM**

Application of CALPHAD Modeling Tools to the Exploration of Alternative Titanium Alloys for Additive Manufacturing: Ryan Jennings; Ben Brown; Benjamin Sikora; Kansas City National Security Campus

**9:15 AM**

Development of a Thermodynamics-informed Materials Design Simulator: Aurelien Perrrot; Patrice Turchi; Vincenzo Lordi; Joseph McKeown; Manyalibo Matthews; Lawrence Livermore National Laboratory

**9:35 AM Break**

**9:55 AM Invited**

Integrated Computational Framework for Prediction of Solidification Reactions and Topologically Closed Packed Phases for New Alloy Design in Additive Manufacturing: Amrita Mishra; Gautam Priyadarshan; Yizhou Lu; University of Mississippi

**10:15 AM Invited**

**3D Insights on Additive Melt Pools: Implications for Alloy Design:** Andrew Polonsky; McLean Echlin; N. Raghavan; Ryan Dehoff; Michael Kirka; Tresa Pollock; University of California, Santa Barbara; Oak Ridge National Laboratory

**10:45 AM Invited**

Challenges and Underlying Mechanisms in Processing of Aluminum Alloys via Direct Metal Laser Melting (DMLM): Vipul Gupta; Laura Dial; P.R. Subramanian; Eric Ott; GE Global Research; GE Additive

**11:05 AM**

Aluminum-cerium-based Alloy Development for Laser Powder Bed Fusion: Hunter Henderson; Zachary Sims; Michael Thompson; Michael Kessler; Alex Plotkowski; Peeyush Nandwana; Frederick List; Scott McCaul; Tian Li; David Weiss; Ryan Ott; Fanjiang Meng; Ryan Dehoff; Orlando Rios; Oak Ridge National Laboratory; University of Tennessee; Lawrence Livermore National Laboratory; Eck Industries, Inc.; Ames Laboratory
11:25 AM
Development of High Strength Al-Mg Alloy for Additive Technologies with Reduced Scandium Content: Viktor Mann1; Alexander Krokhin1; Dmitriy Ryabov1; Sergey Polyakov2; Roman Vakhromov2; Daria Daubarayté2; Vladimir Korolev2; 1RUSAL Global Management B.V.; 2Light Materials and Technologies Institute

### ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Bonding with Kinetic Energy

**Sponsored by:** TMS: Powder Materials Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Markus Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

**Monday AM | March 11, 2019**

221B | Henry B. Gonzalez Convention Center

**Session Chair:** Nihan Tuncer, Desktop Metal

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**8:00 AM Invited**

Impact-induced Solid State Bond at Micron Scale: Toward Additive Manufacturing via Kinetic Energy: Mostafa Hassanni-Gangaraj1; David Veysset2; Keith Nelson2; Christopher Schuh2; 1Massachusetts Institute of Technology

**8:40 AM**

Bonding Features and Microstructural Evolution in Cold Sprayed Metallic Coatings and Bulks: A New Materials Perspective: Yu Zou1; 1University of Toronto

**9:00 AM**

Ultrasonic Additive Manufacturing of Nanocrystalline Materials: Austin Ward1; Zachary Cordero1; 1Rice University

**9:20 AM**

Net-shape Ambient Temperature Metal Additive Manufacturing using Acoustic Energy and Multi-material Printing Prospects: Anagh Deshpande1; Keng Hsu1; 1University of Louisville

**9:40 AM Break**

**10:00 AM**

Development of a Low Earth Orbit Metal 3D Printing Capability with 30kHz Ultrasonic Additive Manufacturing (UAM): Adam Hehr1; Mark Norfolk1; Justin Wenne1; Tracie Prater1; 1Fabrisonic LLC; 2NASA Marshall Space Flight Center

**10:20 AM**

Binder Jetting Additive Manufacturing of Metallic Foam Structures: Hadi Miyangji1; Mark Atwater1; Kristopher Darling1; Ashwath Kumar1; Vincent Hammond1; Christopher Williams1; 1Design, Research, and Education for Additive Manufacturing Systems Laboratory Department of Mechanical Engineering, Virginia Tech; 2Safety and Technology, Department of Applied Engineering, Millersville University; 3US Army Research Laboratory, Aberdeen Proving Ground

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### CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session I

**Sponsored by:** TMS: Shaping and Forming Committee

**Program Organizers:** Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

**Monday AM | March 11, 2019**

302A | Henry B. Gonzalez Convention Center

**Session Chairs:** Josh Kacher, Georgia Institute of Technology; Thomas Britton, Imperial College London

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**8:00 AM Invited**

A Refined Template Matching Approach to Index Electron Backscatter Diffraction Patterns: Alex Foden1; David Collins2; Angus Wilkinson3; Thomas Britton4; 1Imperial College London; 2University of Birmingham; 3University of Oxford

**8:30 AM**

Coherent Diffraction Imaging of Strain at the Nanoscale: Ross Harder1; Mathew Cherukara2; Andrew Ulvestad3; 1Argonne National Laboratory

**8:50 AM**

3D Characterization of Shock-induced Damage in Wrought Ta: Paul Rottmann1; Andrew Polonsky2; Marie-Agathe Charpagne3; George Gray4; Tresa Pollock5; 1Materials Department, University of California, Santa Barbara; 2Dynamic Materials Properties, Testing, and Modeling, Los Alamos National Laboratory

**9:10 AM**

In Situ Measurement of Slip System Softening Resulting from Planar Slip in an Aluminum-Lithium Alloy: Wesley Tayor1; Kelly Nygren1; Roy Crooks2; Darren Pagan3; 1NASA Langley Research Center; 2Cornell High Energy Synchrotron Source; 3Black Laboratories, L.L.C.

**9:30 AM Break**

**9:50 AM Invited**

Understanding Fatigue-induced Dislocation Processes at Grain and Twin Boundaries: Josh Kacher1; Yung Suk Jeremy Yoo2; Pragna Bhaskar2; 1Georgia Institute of Technology

**10:20 AM**

Deformation and Degradation of Superelastic NiTi under Multiaxial Cyclic Loadings: Wei Neng Hsu1; Efthymios Polatidis1; Miroslav Smid1; Ivo Kubena2; Steven Van Petegem3; Helena Van Swygenhoven4; 1Paul Scherrer Institute; 2Institute of Physics of Materials ASCR

**10:40 AM**

Plastic Deformation of InSb Micro-pillars: A Comparative Study Between Spatially Resolved Laue and Monochromatic X-ray Micro-diffraction Maps: Tarik Sadat1; Mariana Verezhak2; Pierre Godard3; Pierre-Olivier Renault3; Steven Van Petegem2; Vincent Jacques2; Ana Diaz2; Daniel Grolimund4; Ludovic Thilly5; 1University Of Poitiers; 2Paul Scherrer Institute; 3LPS-Orsay

**11:00 AM**

Texture Evolution of Warm Rolled Uranium Plate and its Effects on Formability: Ryan Mier1; Cody Miller1; Daniel Coughlin1; Rodney McCabe1; 1Los Alamos National Laboratory
In Situ EBSD Characterization of Lattice Rotation during Tensile Testing of Ti-6Al-4V: A Tool for the Analysis of Deformation Processes and Strain Partitioning: Samuel Hemery; Patrick Villechaise; 1prime Institute - ENSMA; 2Institute Prime - ENSMA

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development in Rare Earth Permanent Magnets

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Monday AM | March 11, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Scott McCall, Lawrence Livermore National Laboratory

8:00 AM Invited
Prospect of Sm(Fe,Co)12-based Permanent Magnets: Kazuhiro Hono; 1National Institute for Materials Science

8:30 AM Invited
Recent Progress in RFe12-type Compounds for Permanent Magnet Applications: Daniel Salazar; 1BCMaterials

9:00 AM

9:20 AM

9:40 AM Break

10:00 AM Invited
Development of Hard Magnetic Properties in Pr-Co-B Alloys: Cajetan Ikenna Niebedim; Matthew Kramer; Michael McGuire; Mariappan Paranthaman; 2Ames Laboratory; 2Oak Ridge National Laboratory

10:30 AM

10:45 AM

11:00 AM

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Quality and Reliability of Advanced Microelectronic Packaging

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Monday AM | March 11, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Nilesh Badwe, Intel Corporation; Fu Guo, Beijing University of Technology

8:00 AM Introductory Comments

8:05 AM

Effect of Thermomigration-electromigration Coupling on Mass Transport in Cu Thin Films: Nalla Somaiah; Abhik Choudhury; Praveen Kumar; 1Indian Institute of Science

8:25 AM

Electromigration and Thermally-induced Damage in Single and Bicrystal Sn Solder Joints Analyzed by Electron Backscatter Diffraction and X-ray Tomography: Marion Branch Kelly; Nikhilesh Chawla; 1Arizona State University

8:45 AM

Effect of Reflow Profile on Microstructure and Mechanical Properties of Low Melting Alloy (SAC/SnBi): Mohammed Genanu; Faramarz Hadian; Octavie Renigonn Kourame; Michael Meilunas; Jim Wilcox; Eric Cotts; 1Binghamton University

9:05 AM

Understanding Driving Forces and Mechanisms of Tin Whisker Formation Using Multi-physics Simulations in a Crystal Plasticity Framework: Aritra Chakraborty; Pratheek Shanthraj; Philip Eisenlohr; 1Michigan State University; 2The University of Manchester

9:25 AM Break

9:45 AM

Mechanical Reliability of Photovoltaic Cells under Cyclic Thermal Loading: Dipali Sonawane; Praveen Kumar; 1Indian Institute of Science

10:05 AM

Mechanism of Electromigration Failure in Micro Solder Joint: Hossein Madanipour; Choong-un Kim; Yiram Kim; 1University of Texas Arlington

10:25 AM

Effect of Strengthening Mechanism, Ageing and Shear Rate on Peak Force and Absorbed Energy of Tin-based Solder Balls Reflowed to a Copper Substrate: Keith Sweetman; Wayne Ng; Tetsuya Akiwa; Pavithiran Narayanan; Tetsuro Nishimura; Takatoshi Nishimura; 1Nihon Superior Co Ltd

10:45 AM

Microrheology Modeling of Defects and Their Role in the Performance of Tin Solder Interconnects: Zachary Morgan; Yongmei Jin; Vahid Attari; Raymundo Arroyave; 1Michigan Technological University; 2Texas A&M University
CHARACTERIZATION

Advanced Real Time Imaging — Iron and Steelmaking I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy; National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Monday AM | March 11, 2019
302B | Henry B. Gonzalez Convention Center

Session Chair: Jinichiro Nakano, United States Department of Energy National Energy Technology Laboratory

8:00 AM Keynote
Application of Confocal Scanning Laser Microscope at ArcelorMittal Global R&D: Hongbin Yin1; ArcelorMittal Global R&D

8:30 AM Invited
Visualization for Molten Slag Clogging Behavior during Softening and Melting of Slag Particles Packed Bed with Micro CT Observation: Ko-ichiro Ohno1; Takayuki Maeda1; Kazuya Kunitomo1; Kyushu University

9:00 AM
Wettability of Graphite-CaO-2Al2O3 Composites against Molten CaO-SiO2-Al2O3-MgO Sags: Ziyao Zhang1; Noritaka Saito1; Kunihiko Nakashima1; Kyushu University

9:20 AM
A Novel Method of Surface Tension Test for Melt Slags Based on Hot Thermocouple Technique: Zhe Wang1; Guanghua Wen1; Ping Tang1; Zibing Hou1; Chongqing University

9:40 AM Break

10:00 AM Invited
In Situ Observation on the Interactions of Non-metallic Inclusions on the Surface of Liquid Steel: Youngjo Kang2; Piotr Scheller3; Kazuki Morita1; Sichen Du2; Dong-A University; University of Science and Technology Beijing, China/TU Bergakademie Freiberg, Germany; The University of Tokyo; Royal Institute of Technology

10:30 AM
Apparent Size of Liquid Inclusions at the Steel-gas Interface: Mauro Ferreira1; P. Chris Pistorius1; Carnegie Mellon University

10:50 AM
The Effect of Viscosity of Liquid Slags on Wetting and Spreading Kinetics in Contact with MgO-C Refractory: Yongsug Chung1; Jong Oh Jo1; Korea Polytechnic University; Hyundai Steel Company

MATERIALS PROCESSING

Advances in Surface Engineering — Session I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarak, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Monday AM | March 11, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Kumar Sundaram, Novelis Corporation; Rajeev Gupta, The University of Akron; Sedigheh Rashidi, The University of Akron

8:00 AM Invited
The Roles of Al and Sn Alloying on Corrosion of Antimicrobial Cu-Al-Sn Alloys: Mike Hutchison1; Carol Glover1; John Scully1; University of Virginia

8:20 AM
Interaction between Additive Manufacturing Defects and Two Corrosive Environments: Holly Martin1; Brett Conner1; Youngstown State University

8:40 AM Invited
Graphene Coating: A Novel Nano Approach for Remarkable Corrosion Resistance: Raman Singh1; Monash University

9:00 AM
Influence of Heat Treatment on the Corrosion Resistance of AZ31B Cold Sprayed by AA7075: Sugrib Shaha1; Yuna Xue1; Xin Pang1; Hamid Jahed1; University of Waterloo

9:20 AM Break

9:40 AM
Pulse Galvanostatic Electrodeposition of Ag-Cu Thin Film Coating with Advanced Mechanical and Corrosion Properties: Nandita Kayol1; Sambedan Jena1; Sourav Das1; Arijit Mitra1; Siddhartha Das1; Karabi Das1; Indian Institute of Technology Kharagpur

10:00 AM
Study on the Microstructure and Thermal Corrosion Behavior of Nanostructured GH864 Superalloy: Wenbin Ma1; Beihang University

10:20 AM
Laser Shock Processing of Ceramic Materials: Bai Cui1; Fei Wang1; Xueliang Yan1; Chenfei Zhang1; Leimin Deng1; Yongfeng Lu2; Michael Nastasi1; University of Nebraska, Lincoln

10:40 AM
Effect of Powder Composition, Laser Power and Load Variation on the Wear Depth and Wear Volume of Hybrid Titanium Alloy MMCs: Franklin Ochonogor1; Esther Akinlabi1; Kasongo Nyembwe1; University of Johannesburg
MATERIALS DESIGN


*Sponsored by:* TMS: Computational Materials Science and Engineering Committee, TMS: Phase Transformations Committee, TMS: Integrated Computational Materials Engineering Committee

*Program Organizers:* Mohsen Asle Zaeem, Colorado School of Mines; Garrett Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

*Monday AM | March 11, 2019
304A | Henry B. Gonzalez Convention Center

*Session Chair:* Mohsen Asle Zaeem, Colorado School of Mines

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8:00 AM Introductory Comments

8:10 AM Invited

GPU-Enabled Algorithms for Ground-State and Excited-State Density Functional Tight Binding Simulations: Bryan Wong; M. Belen Oviedo; Sarah Allec; University of California, Riverside

8:40 AM Invited

A Variational Principle for Mass Transport Calculations: Dallas Trintle; University of Illinois, Champaign

9:10 AM Algorithms and Metrics for Characterization of Arbitrary Atomic Structures: Dustin Doty; Brandon Snow; Oliver Johnson; Brigham Young University

9:30 AM Break

10:00 AM Invited

Applications of Machine Learning to Potential Development for Molecular Dynamics of Ti: Christopher Barrett; Doyl Dickel; Mississippi State University

10:30 AM

A Multiscale Computational Framework for 2D Titanium Carbides (Ti1Cn) MXenes: Ning Zhang; Yu Hong; Mohsen Asle Zaeem; Colorado School of Mines

10:50 AM Development, Testing, and Application of Physically-informed Artificial Neural Network Potentials for Silicon and Germanium Systems: James Hickman; Ganga Purja Pun; Francesca Tavazza; Yuri Mishin; National Institute of Standards and Technology; George Mason University

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ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session I

*Sponsored by:* TMS: Alloy Phases Committee

*Program Organizers:* Sinn-wen Chen, National Tsing Hua University; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

*Monday AM | March 11, 2019
216B | Henry B. Gonzalez Convention Center

*Session Chairs:* Sinn-wen Chen, National Tsing Hua University; Takao Mori, National Institute for Materials Science

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8:00 AM Introductory Comments

8:05 AM Invited

Fabrication and Properties Evaluation of Thermoelectric Thin Films. Takao Mori; NIMS

8:25 AM Invited

Advanced Materials for Efficient High Temperature Thermoelectric Power Generation: Jean-Pierre Fleurlia; Sabah Bux; Jet Propulsion Laboratory

8:45 AM Invited

Boosting the Thermoelectric Performance to New Borders: Thin Film Heusler Systems: Ernst Bauer; Bernhard Hinterleitner; Christoph Eisenmenger; Michael Stögter-Pollach; Naoyuki Kawamoto; Yohei Kakefuda; Takao Mori; Yongpeng Shi; Sami Ullah; Qiang Xie; Xing-Qiu Chen; Vienna University of Technology; NIMS Tsukuba; Shenanyang National Laboratory for Materials Science, Shenyang

9:05 AM

Progress towards the Development of High Temperature Advanced Thermoelectric Devices: Performance, Long Term Stability and Degradation Mechanisms: Billy Li; Samad Firdosy; Jong-Ah Paik; Ike Chi; Fivos Drymiotis; Michell Aranda; Obed Villalpando; Kevin Smith; George Nakatsukasa; Thierry Calliat; Vilupanur Ravi; Jean-Pierre Fleurlia; Jet Propulsion Laboratory

9:25 AM Invited

Customizing Ternary Co-Ge-Te Skutterudites to Boost Thermoelectric Performance: Li-Chyong Chen; Kuei-Hsien Chen; Deniz Wong; National Taiwan University; Academia Sinica

9:45 AM Break

10:05 AM Invited

Properties and Applications of 2D semiconductors: Kyeongjae Cho; University of Texas, Dallas

10:25 AM Invited

Effective Approaches for Dramatically Enhancing the Thermoelectric Properties of Various Oxide Ceramics Through Engineering the Grain Boundaries: Xueyan Song; Liang Liang; Cesar-Octavio Romo-De-La-Cruz; Sergio Paredes Nava; Cullen Boyle; Bryan Jackson; Alec Hinerman; Jacky Prucz; Yun Chen; West Virginia University
CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — General Methods and Development

**Sponsored by:** TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

**Monday AM | March 11, 2019**

303A | Henry B. Gonzalez Convention Center

**Session Chairs:** David Seidman, Northwestern University; Haiming Wen, Missouri University of Science & Technology

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**8:00 AM** Introductory Comments

**8:05 AM** Invited

Bringing Atom Probe Tomography to a Manufacturing Environment: Robert Ulfig; David Reinhard; Tim Payne; Dan Lenz; Ty Prosa; Peter Clifton; Olivier Dulac; David Larson; CAMECA Instruments Inc.

**8:40 AM** Invited

Selected Topics in Atom Probe Tomography: Yield and Reconstruction: David Larson; Brian Geiser; Ty Prosa; Cameca

**9:15 AM**


**9:35 AM** Break

**9:55 AM** Invited

Improving Atom Probe with Field Ion Microscopy: Leigh Stephenson; Shyam Katnagallu; Isabelle Mouton; Christoph Freysoldt; Dierk Raabe; Baptiste Gault; Max Planck Institut für Eisenforschung

**10:30 AM**

In Situ Field Evaporation of Atom Probe Tomography Specimens Followed in Transmission Electron Microscopy: Williams Lefebvre; Antoine Normand; Celia Castro; François Vurpillot; Normandie University UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, F-

**10:50 AM** Invited

Data Science for Atom Probe Tomography: Krishna Rajan; University At Buffalo, State University of New York

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BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

**Monday AM | March 11, 2019**

217C | Henry B. Gonzalez Convention Center

**Session Chairs:** Candan Tamerler, University of Kansas; Po-Yu Chen, National Tsing Hua University

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**8:00 AM** Keynote

Atomically Precise Manufacturing: David Forrest; Us Department Of Energy

**8:40 AM**

Polarized Raman Spectroscopy of Self-assembled Peptides for Characterization of Molecular Conformations: Nao Koishihara; Takuma Narimatsu; Peijing Li; Chen Chen; Yuhei Hayamizu; Tokyo Institute of Technology

**9:00 AM** Keynote

Creating Functional Bionanomaterials By Influencing Biotic-Abiotic Interactions: Joseph Stock; Zhifeng Kuang; Kristi Singh; Patrick Dennis; Rajesh Nait; Air Force Research Laboratory

**9:40 AM** Break

**10:00 AM** Keynote

A Decade of Research on Manufacturing at the Nano-bio Interface: Mohan Edirisinghe; University College London

**10:40 AM**

Unveiling the Ultrastructural and Mechanistic Aspects of Zebrafish Fin Regeneration by the PeakForce Quantitative Nanomechanical Mapping Technique: Yang-Rong Shih; Yung-Jen Chuang; Po-Yu Chen; National Tsing Hua University

**11:00 AM** Invited

Controlling the Ionic Environment of Extracellular Fluid: Marco Rolandi; University of California, Santa Cruz

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**MONDAY AM**

**TECHNICAL PROGRAM**

**BIOMATERIALS**

Biological Materials Science — Biological and Natural Materials I

*Sponsored by:* TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Monday AM | March 11, 2019
217A | Henry B. Gonzalez Convention Center

**Session Chairs:** Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Steven Naleway, University of Utah

8:00 AM Introductory Comments

8:05 AM Keynote
Fracture, Disease and Therapies in Human Bone: Robert Ritchie1; Vinodh Thomas2; Liqiang Lin1; Xiaodu Wang1; Xiaowei Zeng1; Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

8:45 AM

**Computational Model of Bone lamella:** Mohammad Maghsoudi-Ganjeh1; Liqiang Lin1; Xiaodu Wang1; Xiaowei Zeng1; Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

9:05 AM Biological Tissue Stiffness Control by 2-Propanol and Moisture due to Collagen Fibril Intermolecular Spacing Changes: Richard Haverkamp1; Texas A&M University Department of Nuclear Engineering

9:25 AM 3D Contact and Strain in Alveolar Bone Under Tooth/Implant Loading: Yuxiao Zhou1; Chujeong Gong2; Mehran Hossaini-Zadeh2; Jing Du1; Pennsylvania State University; Temple University

9:45 AM Break

10:05 AM Invited
Shear-punch Testing of Human Cranial Bone and Surrogate Materials: Andrew Brown1; C. Allan Gunnarsson2; Karin Rafael3; Stephen Alexander4; Thomas Plaisted5; Tusit Weerasooriya1; U.S. Army Research Laboratory; SURVICE Engineering

10:35 AM Study on the Toughening Mechanisms of Collagenous Materials by using Real-time X-ray Characterization and Imaging: Wen Yang1; Haocheng Quan1; Eric Schaible2; Robert Ritchie3; Marc Meyers4; University of California San Diego; Lawrence Berkeley National Laboratory; University of California, Berkeley

10:55 AM Invited
Bird Feathers and Bones: Ultralight Natural Materials: Marc Meyers1; Eduard Arzt2; Pablo Zavattieri3; Horacio Espinosa4; University of California, San Diego; INM - Leibniz Institute for New Materials; Purdue University; Northwestern University

**NUCLEAR MATERIALS**

Ceramic Materials for Nuclear Energy Research and Applications — Thermodynamics and Structural Properties

*Sponsored by:* TMS: Nuclear Materials Committee

**Program Organizers:** Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission-JRC-Institute of Transuranium Elements

Monday AM | March 11, 2019
214A | Henry B. Gonzalez Convention Center

**Session Chairs:** David Andersson, Los Alamos National Laboratory; Haixuan Xu, University of Tennessee

8:00 AM Invited
Atomic Structure of Overstoichiometric Uranium Oxide: Insights from Molecular Dynamics Simulations with a Many Body Variable Charge Model: Jean-paul Crocombette1; Aurélien Soulié2; CEA Saclay DEN-SRMP; CEA Saclay DEN-SRMP

8:30 AM
Mechanisms for Diffusion of Uranium Interstitials in UO2: Anders Andersson1; Yang-Ang Liu2; Topher Matthews3; Los Alamos National Laboratory

8:50 AM Characterization of Defects Structures in Fast-reactor MOX Fuels: Riley Parrish1; Assel Aitkaliyeva2; University of Florida

9:10 AM Invited
Structural Features in Mixed Uranium Oxides with Fluorite-related Structures: Gianguido Baldinozzi1; Laboratoire SPMS CNRS Centralesupelec and CEA DEN DMN SRMA

9:40 AM Break

10:00 AM Invited
Crystallographic and Electronic Structure in Ln-U-O Compounds: Xiaotao Zu1; Louis Casillas-Trujillo2; Gianguido Baldinozzi1; Kurt Sickafus1; University of Tennessee; Centre National de la Recherche Scientifique

10:30 AM
Uranium Silicide-based Nuclear Fuel Phase Relations and Computed In-reactor Thermochemical Behavior: Theodore Besmann1; Tashiema Wilson1; Denise Lopes2; Emily Moore3; Vancho Kocesvki4; Joshua White5; Jacob McMurray6; Dongwon Shin7; Antoine Claessens8; Peng Xu9; University Of South Carolina; Los Alamos National Laboratory; Oak Ridge National Laboratory; Westinghouse Company, LLC

11:00 AM An Engineering Representation of the Thermal Conductivity of a UO2 and BeO Composite Nuclear Fuel: Ryan Brito1; Sean McDeavitt1; Texas A&M University Department of Nuclear Engineering
**CHARACTERIZATION**

**Characterization of Minerals, Metals, and Materials — Characterization Method Development I**

**Sponsored by:** TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday AM | March 11, 2019
212B | Henry B. Gonzalez Convention Center

**Session Chair:** Jian Li, CanmetMATERIALS

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**8:00 AM Introductory Comments**

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**8:05 AM Invited**

Development of Stereological Transfer Functions for Grain and Particle Size Characterization: Eric Payton1; Austin Gertl2; Amanda Criner1; 1Air Force Research Laboratory; 2UES, Inc

**8:25 AM Invited**

Commentary - Are There Still Places for Gallium FIB: Tian Yunqing1; 1Canmetmaterials

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**8:45 AM**

Towards the Materials Oscilloscope: In-situ and Time-resolved Diffraction from Metals Related to Thermo Mechanical Processes: Klaus-Dieter Liss1; 1Guangdong Technion - Israel Institute of Technology (GTIT)

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**9:05 AM Invited**

Development of Road Surface Scanning System Using Multiple Sensing Techniques: Jeongguk Kim1; 1Korea Railroad Research Institute

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**9:25 AM**

Crystallizing Spherical Electron Backscatter Diffraction - Indexing and Cross Correlation: Ralf Hielsher1; Felix Bartel1; Alex Foden1; Thomas Britton2; 1TU Chemnitz; 2Imperial College London

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**9:45 AM Break**

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**10:00 AM**

Viscosity Measurements of Ionic Liquid Lubricants for Space Applications: Sayavur Bakhtiyarov1; 1New Mexico Institute of Mining & Technology

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**10:20 AM**

Convolutional Neural Networks for Accelerated Crystallographic Orientation Mapping: Yu-Feng Shen1; Rejuj Pokhariel1; Turab Lookman2; Anil Kumar3; Thomas Nizolek4; 1Los Alamos National Laboratory

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**10:40 AM**

Structure of Nano-crystalline Thin Layers by Glancing Incidence X-ray Diffraction: Gianguido Baldinozzi1; Vassilis Pontikis2; David Simeone2; 1Laboratoire SPMS CNRS Centralesupelec and CEA DEN DMN SRMA; 2CEA DRF Iramis
CORROSION

Coatings and Surface Engineering for Environmental Protection — Corrosion Mechanisms & Performance Evaluations I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Monday AM | March 11, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Raul Rebak, GE Global Research; Arif Mubarok, PPG

8:00 AM Invited
Coating Performance and Atmospheric Corrosion Measurements: Brandi Clark\textsuperscript{1}; Fritz Friedersdorf\textsuperscript{1}; Jacob Wright\textsuperscript{1}; Liam Agnew\textsuperscript{1}; \textsuperscript{1}Luna Innovations, Inc

8:40 AM
Corrosion Study of Cu-Ag Alloy in the Presence of Benzotriazole Inhibitor: Hooman Rahmani\textsuperscript{1}; Efstathios Meletis\textsuperscript{1}; \textsuperscript{1}Department of Materials Science and Engineering, University of Texas at Arlington

9:00 AM
Electrochemical Mechanism and Preparation of Cr-low Carbon Steel Composite in a NaCl–KCl–NaF–Cr2O3 Molten Salt: Shixian Zhang\textsuperscript{1}; Yungang Li\textsuperscript{2}; Kai Hu\textsuperscript{3}; Xiaoping Zhao\textsuperscript{4}; \textsuperscript{1}North China University of Science and Technology; \textsuperscript{2}Chongqing University; \textsuperscript{3}Hebei College of Industry and Technology

9:20 AM
Influence of Surface States of Steels on Inhibition Performance of an Imidazoline-based Inhibitor in CO\textsubscript{2} Environments: Huanhuan Zhang\textsuperscript{1}; Xiaolu Pang\textsuperscript{1}; Huisheng Yang\textsuperscript{1}; Yanjing Su\textsuperscript{1}; Kewei Gao\textsuperscript{1}; \textsuperscript{1}University of Science and Technology Beijing

9:40 AM Break

10:00 AM
Influence of Aluminum Concentration in Zinc Bath on Galvanizing Behavior of a Dual Phase High Strength Steel: Kefan Chen\textsuperscript{1}; Bin Li\textsuperscript{2}; Imran Aslam\textsuperscript{3}; \textsuperscript{1}University of Nevada, Reno; \textsuperscript{2}Mississippi State University

10:20 AM Invited
Diamond-like Carbon Coating for Drill Collars — Test Experiences: Nausha Asrar\textsuperscript{1}; Jeffrey Ham\textsuperscript{2}; \textsuperscript{1}Schlumberger

MATERIALS DESIGN

Computational Materials Discovery and Design — Applications to Surfaces, Interfaces, and 2D Materials

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

Monday AM | March 11, 2019
304C | Henry B. Gonzalez Convention Center

Session Chairs: Heather Murdoch, US Army Research Laboratory; Jake Bair, Pacific Northwest National Laboratory

8:00 AM Invited
Designer 2D Metals and Weyl Semimetals: Prineha Narang\textsuperscript{1}; \textsuperscript{1}Harvard University

8:30 AM Invited
Exploration of Interfacial Transitions by Correlating Atomic Scale Microscopy with Atomic Simulations: Christian Liebscher\textsuperscript{1}; Nicolas Peter\textsuperscript{1}; Thorsten Meiners\textsuperscript{1}; Gerhard Dehm\textsuperscript{1}; \textsuperscript{1}Max-Planck-Institut

9:00 AM
A Screening of Pt Alloys with P-block Elements and the DFT Study of Alloying Effect for Oxygen Reduction Reaction: Jung Woo Choi\textsuperscript{1}; Soohno Kwon\textsuperscript{1}; Hyuck Mo Lee\textsuperscript{1}; \textsuperscript{1}KAIST

9:20 AM
Superior Structural, Elastic and Electronic Properties of 2D Titanium Nitride MXenes Over Carbide MXenes: A Comprehensive First Principles Study: Ning Zhang\textsuperscript{1}; Yu Hong\textsuperscript{1}; Mohsen Asle Zaeem\textsuperscript{1}; \textsuperscript{1}Colorado School of Mines

9:40 AM Break

10:00 AM
Computational Discovery and Design of 2D Transition Metal Dichalcogenide Heterostructures: Lan Li\textsuperscript{1}; \textsuperscript{1}Boise State University

10:20 AM
Goniopolarity of Thermal Transport Behavior in Layered 2D Materials: Yaxian Wang\textsuperscript{1}; Joshua Goldberger\textsuperscript{1}; Joseph Heremans\textsuperscript{1}; Maxx Arguilla\textsuperscript{1}; Wolfgang Windl\textsuperscript{1}; Bin He\textsuperscript{1}; \textsuperscript{1}Ohio State University

10:40 AM
Computational Design of Non-precious Transition Metal/Nitrogen Doped Carbon as Effective Fuel Cell Electro catalysts: Guofeng Wang\textsuperscript{1}; Xuxi Liu\textsuperscript{1}; Boyang Li\textsuperscript{1}; \textsuperscript{1}University of Pittsburgh

11:00 AM
Enhancement of Chemical Stability of Phosphorene and Heterostructures on its Basis: Results of Ab-initio Modelling: Andrey Kistanov\textsuperscript{1}; Elena Korznikova\textsuperscript{1}; \textsuperscript{1}Nanyang Technological University; \textsuperscript{1}IMSP RAS
PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Computational Discovery

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Monday AM | March 11, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Fadi Abdeljawad, Clemson University; Kristin Persson, University of California, Berkeley

8:00 AM Invited
Computational Discovery of Novel Structural and Functional Heusler Compounds: Christopher Wolverton; 1Northwestern University

8:30 AM

8:50 AM
Thermodynamic Design of Dual Phase Steels within an Information-fusion Framework: Richard Couperthwaite; Raymundo Arroyave; Ibrahim Karaman; Ankit Srivastava; Douglas Allaire; 1Texas A&M University

9:10 AM Invited
Discovery and Design of Novel Materials for Energy Applications: Kristin Persson; 1University of California Berkeley

9:40 AM Break

10:00 AM Invited
Thermodynamic and Kinetic Descriptions of Multicomponent Crystals: Anton Van Der Ven; John Thomas; Brian Puchala; Anirudh Natarajan; 1University of California

10:30 AM
Design and Discovery of Ceramic Matrix Composites by Assessment of Inverse Phase Stability and Microstructural Evolution: Elias Munoz; Vahid Attari; Thien Duong; Raymundo Arroyave; 1Texas A&M University

10:50 AM
First-principle Studies of Charged Point Defects in Two-dimensional Semiconductors: Biswas Rijal; Christoph Freysoldt; Enrique Batista; Ping Yang; Richard Hennig; 1University of Florida; 2Max Planck Institute for Iron Research; 3Los Alamos National Laboratory

11:10 AM Invited
Phase Equilibria and Kinetics of Sodium Superionic Conductors: Shyue Ping Ong; 1University of California, San Diego

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — High Entropy Alloys and Strength Models

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detroit, National Energy Technology Laboratory

Monday AM | March 11, 2019
301C | Henry B. Gonzalez Convention Center

Session Chairs: Michael Titus, Purdue University; Martin Detroit, National Energy Technology Laboratory

8:00 AM Invited
Single-crystal Mechanical Behavior of High- and Medium-entropy Alloys: Florian Fox; Pascal Thome; J. Pfetzing-Micklich; A. Kostka; Gunther Eggler; Eseo George; 1Ruhr University Bochum; 2Oak Ridge National Laboratory

8:30 AM Invited
Refractory High Entropy Alloys as Potential Candidates for High Temperature Applications beyond Ni Based Superalloys and Conventional Refractory Alloys: Oleg Senkov; Daniel Miracle; Todd Butler; Kevin Chaput; Raj Banerjee; 1Air Force Research Laboratory; 2University of North Texas

9:00 AM
Design, Mechanical Performance and Deformation Characteristics of a New ‘ Strengthened Ni-based Superalloy with High-entropy Matrix: Martin Detroit; Paul Jablonski; Stoichko Antonov; Sammy Tin; Jeffrey Hawk; 1National Energy Technology Laboratory; 2University of Science and Technology Beijing; 3Illinois Institute of Technology

9:20 AM
Predictive Modeling of Temperature-dependent Hardness: Hongyeun Kim; Laszlo Kecskes; Zi-Kui Liu; 1Penn State University; 2Johns Hopkins University

9:40 AM Break

10:00 AM Invited
Solution Strengthening in FCC Random Alloys: Varvenne Celine; Guillaume Bracq; Mathilde Laurent-Brocq; William Curtin; 1Cnrs Aix-Marseille University; 2UPEC - CNRS; 3EPFL

10:30 AM Invited
Large Scale Atomistic Simulations of The Interaction of Glide Screw Dislocations with Twin Boundaries in FCC Bipillars: Satish Rao; Edwin Antillon; Brahim Akdim; Tripanic Parthusarathy; Christopher Woodward; 1UES, Inc.; 2U.S. Air Force Research Laboratory

11:00 AM
Intrinsic Nano Diffusion-couples for Studying High-temperature Diffusion in Compositionally-complex Superalloys: Erdmann Spiecker; Yolita Eggerler; 1University of Erlangen, Nürnberg; 2University of Erlangen, Nürnberg

1:20 AM
Origin of the Significant Impact of Ta on the Creep Resistance of FeCrNi Alloys: Xavier Sauvage; Damien Magné; Mathieu Couvrat; 1CNRS - GPM - University Rouen Normandy; 2Manoir Industries
SPECIAL TOPICS

Diversity in STEM and Best Practices to Improve it — Best Practices and Lessons Learned

Program Organizers: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica Krogsstad, University of Illinois at Urbana-Champaign; Panthea Sepehrband, Santa Clara University

Monday AM | March 11, 2019
301B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute; Jessica Krogsstad. University of Illinois, Urbana-Champaign

8:20 AM Introductory Comments

8:30 AM Invited
An Approach to Promote Equality and Diversity in a University Materials Department: Angus Wilkinson1; University of Oxford

9:00 AM Invited
Diversity in STEM: Retention, Graduation and Beyond: Andrea Hodge; University of Southern California

9:30 AM Break

10:00 AM
Best Practices for Promoting Diversity in STEM through Outreach:
Kaitlin Tyler; Nicole Johnson-Glauch; Leon Dean; Jessica Krogsstad; University of Illinois, Urbana-Champaign

10:30 AM Invited
Half a Century of Diversifying TMS: Carolyn Hanson; University of Waterloo

11:00 AM Invited
Navigate an Exciting STEM Career Journey through Diversity: Isabella Van Rooyen; Idaho National Laboratory

MATERIALS PROCESSING

Freeze Linings: Myth and Reality — Freeze Lining I

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Juergen Schmidl, RHI Magnesita; Dean Gregurek, RHI Magnesita; Gerardo Alvear, Glencore Technology; Peter Hayes, University of Queensland; Mark Kennedy, Proval; Partners SA; Maurits Van Camp, Umicore; Camilo Perez, RHI US Ltd; Stefan Luidold, University Of Leoben

Monday AM | March 11, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Juergen Schmidl, RHI Magnesita

8:00 AM Introductory Comments

8:05 AM
Basic Knowledge on Refractory Freeze Linings for Reviewing Post Mortem Studies Results: Juergen Schmidl1; Dean Gregurek1; Alfred Spanning2; RHI Magnesita

8:25 AM
Chemical Interactions between Slag and Refractory or Freeze-lining: Ata Failah Mehrjardi1; Sina Mostaghel1; Gerardo Alvear Flores1; Aurubis

8:45 AM
Influence of CaO/SiO2/Al2O3 Ratio on the Melting Behaviour of SynCon Slags: Dominik Hofer1; Stefan Luidold1; Tobias Beckmann2; Frank Schulenburg3; Montanuniversitaet Leoben; H.C. Starck Smelting GmbH & Co. KG; H.C. Starck GmbH

9:05 AM
Influence of Tap Hole Cooler Design on Matte-cooler Heat Transfer Coefficient and Freeze Lining Thickness: Anton Ishmurzin1; Oliver Kuhnke1; Daniel Kreuzer1; RHI Magnesita

9:25 AM Break

9:45 AM
Evolution of Freeze Linings in Multi-step Processes: Tijl Civits1; Ling Zhang2; Liugang Chen2; Annelies Malfielt2; Umicore; KU Leuven

10:05 AM
Freeze Lining Refractories in Non-ferrous TSL Smelting Systems: Stanho Nikolic1; Ben Hogg1; Paul Voigt1; Glencore Technology

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Mechanical Behavior

Sponsored by: TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass. National Institute of Standards and Technology; Katelen Wertz. Air Force Research Laboratory; Christopher Zenk, Ohio State University

Monday AM | March 11, 2019
206A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Christopher Zenk, The Ohio State University

8:00 AM Invited
Balancing the Property Suite in Co-base Superalloys: Sean Murray1; Brent Goodlett1; Colin Stewart1; Carlos Levi1; Tresa Pollock2; University of California, Santa Barbara

8:30 AM
Structural Evolution of a Single Crystal Co-base Superalloy during Creep at 1000ºC/137 MPa: Stoichchi Antonio1; Song Lu1; Longfei Li1; Qiang Feng1; University of Science and Technology Beijing

8:50 AM
Creep Deformation Mechanisms and Compositional Changes in SX Co-base Superalloys Studied by Means of EM and APT: Malte Lenz1; Yolita Eggeler1; Julian Müller1; Dorota Kubacka1; Surendrar Makineni1; Christopher Zenk1; Nicklas Volz2; Steffen Neumeier2; Peter Felfer2; Christian Gylling2; Gunther Eggeler1; Mathias Göken1; Baptiste Gault1; Dierk Raabe1; Erdmann Speicker1; University Erlangen Nuernberg; MPIE Düsseldorf; Ohio State University; Ruhr-Universität Bochum

9:10 AM
Effect of Tertiary Gamma Prime on the Creep Performance of a Developmental CoNi-Based Superalloy: Ioannis Bantounas1; Vassili Vorontsov1; Mark Hardy1; Imperial College London; Rolls-Royce Plc

9:30 AM Break

9:40 AM Invited
Wrought Co-base Superalloys — Mechanical Properties and Deformation Mechanisms: Steffen Neumeier1; Mathias Göken1; University Erlangen Nuernberg
10:10 AM Invited
Solute Segregation Effects at Planar Defects during Creep of CoNi-based Superalloys: Surendra Kumar Makineni1; Malte Lenz2; Steffen Neumeier3; Erdmann Specker2; Dierk Raabe1; Baptiste Gault1; Max-Planck-Institut für Eisenforschung GmbH; Friedrich-Alexander-Universität Erlangen-Nürnberg

10:40 AM
Crystal Plasticity Finite Element Approach to Modeling the Creep Behavior in Cobalt-based Superalloys: Shahriyar Keshavarz1; Andrew Reid1; Eric Lass1; Carenly Campbell1; National Institute of Standards and Technology

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Sustainable Ceramics

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhamayes, Al Isra University; Jian Li, CanmetMATERIALS: Carlos Mauricio Vieira, State University of the North Fluminense: Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Monday AM | March 11, 2019

Session Chairs: Felipe Lopes, UENF; Jheison Lopes, Instituto Militar de Engenharia

8:00 AM Introductory Comments

8:05 AM Keynote
Recycling of Blast Furnace Sludge into Clay Ceramic: Carlos Fontes Vieira1; Lucas Amaral1; Sergio Neves Monteiro1; State University of the North Fluminense

8:45 AM
Study of Incorporation of Fuel and Fluxing Wastes in Red Ceramics: Gabriela Barreto1; Michelle Babisk2; Geovana Delaqua2; Monica Gadioli1; Carlos Mauricio Vieira1; Universidade Estadual do Norte Fluminense Darcy Ribeiro

9:05 AM
Technical Feasibility of Catalyst Waste as Raw Material for Ceramic Industry: Lucas Amaral1; Geovana Carla Delaqua2; Gabriela Teixeira2; Ulisses Prado2; Sergio Neves2; Carlos Mauricio Vieira2; State University of Northern Rio de Janeiro; LINNING - Representation, Consulting and Projects; Military Engineering Institute

9:25 AM Break

9:35 AM
Incorporation of Dry Biomass of Salvinia Auriculata AUBL from Phytoremediation Process for Traditional Ceramics Production: Geovana Carla Delaqua2; Lucas Amaral1; Carlos Mauricio Vieira1; Sergio Neves2; Universidade Estadual do Norte Fluminense Darcy Ribeiro; Military Engineering Institute

9:55 AM
Evaluation of the Mechanical, Thermal and Swelling Behavior of Hydrogels Containing Clay Laponite RD: Vinicius Dos Santos1; Angelica Zafalon1; Luiz Komatsu1; Vijaya Rangari1; Ademar Lugão1; Duclerc Parra1; Nuclear and Energy Research Institute

10:15 AM
Mechanical and Thermal Properties of Clay Filled Recycled Low Density Polyethylene: Gerald Onyedika1; Genevieve Onuegbu1; Federal University of Technology

10:35 AM
Physical and Mechanical Properties of Artificial Stone Produced with Granite Waste and Vegetable Polyurethane: Maria Luiza Gomes1; Larissa Sobrinho1; Elaine Carvalho1; Rubén Sánchez Rodriguez2; Carlos Mauricio Vieira1; Sérgio Neves Monteiro1; Universidade Estadual do Norte Fluminense Darcy Ribeiro; Military Engineering Institute

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Heterostructured Materials I: Strength and Ductility

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoun Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaoai Wu, Chinese Academy of Sciences

Monday AM | March 11, 2019

Session Chairs: Yuntian Zhu, North Carolina State University; Xiaolu Huang, Chongqing University; Kei Ameyama, Ritsumeikan University; Xiaoai Wu, Chinese Academy of Sciences

8:00 AM Introductory Comments

8:10 AM Invited
Strength and Ductility Improvements of an Mg Alloy with Heterogeneous Layered Structures: Xuan Luo1; Tianlin1; Guilin Wu2; Niels Hansen2; Xiaoai Wu1; Chongqing University; Technical University of Denmark

8:35 AM
Synergistic Strengthening and Work Hardening: Principles toward Superior Mechanical Properties of Heterostructured Materials: Yuntian Zhu1; Xiaoai Wu2; North Carolina State University; Institute of Mechanics, Chinese Academy of Sciences

8:55 AM Invited
A Contrast Study on the Mechanical Behavior and the Underlying Deformation Mechanisms of Homogeneous and Harmonic β-Ti Alloys under Simple Shear Loading Conditions: Guy Dirras1; Frédéric Mompiou2; David Tingaud2; Cecile Marcelot2; Azziz Hocini1; Kei Ameyama1; University Paris 13; CEMES, CNRS; Ritsumeikan University

9:20 AM
Dynamically Reinforced Heterogeneous Grain Structure Prolongs Ductility in a Medium-entropy Alloy with Gigapaschal Yield Strength: Xiaoai Wu1; En Ma2; Institute of Mechanics; Johns Hopkins University
9:40 AM Break

10:00 AM Invited
Effects of Al Content on Air-oxidation Behavior of Ni2FeCoCrAlx High-entropy Superalloys: Fu Pen Cheng1; Wu Kai1; Feng Chih Chien1; Chain Tsuan Liu1; Ji-Jung Kai1; 1Institute of Materials Engineering, National Taiwan Ocean University, Keelung, Taiwan; 2Department of Mechanical Engineering, The Hong Kong Polytechnic University, Hong Kong; 3Department of Mechanical and Biomedical Engineering, The City University of Hong Kong

10:20 AM Structure and Mechanical Property of Nanostructured Ta-Nb-W-Ti High Entropy Alloys Prepared by Powder Metallurgy: Do Hyo Song1; Jin Soo Park2; Sang Jun Kim3; Eun Soo Park4; Jin Kyu Lee5; 1Kongju National University; 2Seoul National University

10:40 AM Exploration of Phase Structure Evolution Induced by Alloying Elements in Ti-(Al-Nb) Alloys via a Chemical-short-range-order Cluster Model: BeiBei Jiang1; Qing Wang2; Chuang Dong3; Peter K. Liaw4; 1Dalian University of Technology; 2The University of Tennessee

11:00 AM High Entropy Transition Metal Carbides: Tyler Harrington1; Joshua Gild1; Pranab Sarkar2; Cormac Toher2; Olivia Dippo3; Eduardo Marin2; Lucas Borowski2; Christina Rost3; Jian Luo1; Stefano Curtarolo1; Donald Brenner1; Kenneth Vecchioni1; 1University of California San Diego; 2Duke University; 3University of Virginia; 4North Carolina State University

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Design and Applications I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Liaw, The University of Tennessee; Michael Gao, National Energy Technology Laboratory

8:00 AM Invited
Fifteen Years of High Entropy Alloys – How Are We Doing?: Daniel Miracle1; 1Air Force Research Laboratory

8:30 AM Invited
High-entropy Functional Materials: Current Status and Outlook: Michael Gao1; Daniel Miracle2; David Maurice3; Xuehui Yan4; Yong Zhang5; Jeffrey Hawk6; 1National Energy Technology Lab; 2AF Research Laboratory; 3University of Science and Technology Beijing

8:50 AM Invited
High Entropy Alloy Foam: Open a New Era of Thermal Protection Utilizing Metals: Kook Noh Yoon1; Khurrum Yaqoob2; Je In Lee3; Jinyeon Kim1; Su Hyeon Kim4; DongEung Kim5; Eun Soo Park6; 1Seoul National University; 2National University of Sciences and Technology; 3Korea Institute of Materials Science; 4Korea Institute of Industrial Technology

9:10 AM Invited
Variable Chemical Order Opens a New “High Entropy” Playground: Evan Mo1; John Hopkins University

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Design and Thermal Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Chuang Dong, Dalian University of Technology; Eun Park, Seoul National University

8:00 AM Invited
Combiantorilal Exploration of High Entropy Alloys: Sebastian Kube1; David Uhl1; Amit Datye2; Apurva Mehta3; Jan Schroers4; 1Yale University; 2Southern Connecticut State University; 3SLAC National Accelerator Laboratory

8:20 AM Invited
Non-equiaxial Refractory High-entropy Alloys Lead to Enhanced High-temperature Properties: Shaolou Wei1; Cem Tanas2; 1Massachusetts Institute of Technology

8:40 AM Invited
CALPHAD Screening and Mechanical Behavior in the AITiZrNbMo Alloy System: Benjamin MacDonald1; Zhiqiang Fu2; Fengwei Guo3; Yongwang Kang4; Xiaohang Xie5; Yizhang Zhang1; Enrique Lavermia1; 1University of California Irvine; 2AECC Beijing Institute of Aeronautical Materials

9:00 AM Invited
Effect of Stacking Fault Energy on Formability of Cr-Mn-Fe-Co-Ni Alloys: JeongWon Ye2h; Kook Noh Yoon3; Hyun Seok Oh4; Sang Jun Kim5; Eun Soo Park1; 1Seoul National University

9:20 AM Invited
Phase Separation and Segregation in Mechanically Alloyed and Long-term Annealed Refractory High Entropy Alloys: Joshua Smeltzer1; B. Chad Hornbuckle2; Anit Giri3; Christopher Marvel4; Christopher Darling5; Jeffrey Rickman6; Helen Chan7; Martin Harmer8; 1Lehigh University; 2U.S. Army Research Laboratory

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Development and Applications I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Liaw, The University of Tennessee; Michael Gao, National Energy Technology Laboratory

8:00 AM Keynote
Fifteen Years of High Entropy Alloys – How Are We Doing?: Daniel Miracle1; 1Air Force Research Laboratory

8:30 AM Invited
High-entropy Functional Materials: Current Status and Outlook: Michael Gao1; Daniel Miracle2; David Maurice3; Xuehui Yan4; Yong Zhang5; Jeffrey Hawk6; 1National Energy Technology Lab; 2AF Research Laboratory; 3University of Science and Technology Beijing

8:50 AM Invited
High Entropy Alloy Foam: Open a New Era of Thermal Protection Utilizing Metals: Kook Noh Yoon1; Khurrum Yaqoob2; Je In Lee3; Jinyeon Kim1; Su Hyeon Kim4; DongEung Kim5; Eun Soo Park6; 1Seoul National University; 2National University of Sciences and Technology; 3Korea Institute of Materials Science; 4Korea Institute of Industrial Technology

9:10 AM Invited
Variable Chemical Order Opens a New “High Entropy” Playground: Evan Mo1; John Hopkins University
9:30 AM Break

9:50 AM Invited
Refractory Complex Concentrated Alloys for High Temperature Applications: Challenges and Opportunities: Oleg Senkov; Daniel Miracle; Jean-Philippe Couzinié; Stephane Gorse; Raj Banerjee; 
1Air Force Research Laboratory; 2Université Paris Est, ICMPE (UMR 7182); CNRS-UPEC; 3CNRS, Université Bordeaux, ICMCB, UPR 9048; 4University of North Texas

10:10 AM Invited
Predictive Multiphase Evolution in Al-containing High-entropy Alloys: Louis Santodonato; Peter Liaw; Raymond Unocic; Hongbin Bi; James Morris; 1Advanced Research Systems, Inc.; 2The University of Tennessee; 3Oak Ridge National Laboratory

10:30 AM Invited
Effects of Electronic Energy Deposition in Concentrated Solid Solution Alloys: William Weber; Eva Zarkadoula; Aleksi Leino; Ritesh Sachan; Yanwen Zhang; 1University of Tennessee; 2Oak Ridge National Laboratory

11:10 AM Invited
Observation of Hexagonal Dendrite Formation in CoCrCuMnxTi HEAs: Nicholas Derimow; Reza Abbaschian; 1University of California Riverside

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Modeling I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: James Morris, Oak Ridge National Laboratory; Michael Widom, Carnegie Mellon University

8:00 AM Invited
Information Theoretical Approaches to Entropy: Michael Widom; 1Carnegie Mellon University

8:20 AM Invited
Dislocation Flow and the Nature of Obstacles in Equiatomic Alloys: James Morris; Yuri Osetsky; George Pharr; 1Oak Ridge National Laboratory; 2Texas A&M

8:40 AM Invited
Tailoring Local Chemical Order for Tunable Stacking Fault Energies in CrCoNi Medium-entropy Alloys: Jun Ding; Qin Yu; Mark Asta; Robert Ritchie; 1Lawrence Berkeley National Laboratory

9:00 AM Invited
Finite Temperature Elastic Properties of CoCrFeNi from First Principles: Yifeng Wu; Douglas Irving; 1North Carolina State University

9:20 AM Invited
How High are the Entropies of High Entropy Alloys?: Kaituo Huo; Qikai Li; Mo Li; 1University of Science and Technology Beijing; 2Georgia Institute of Technology; 3University of Science and Technology Beijing,

9:40 AM Break

10:00 AM Invited
Lattice Strain in a High Entropy Alloy from Model Interatomic Potentials: Diana Farkas; Alfredo Caro; 1Virginia Tech; 2George Washington University

10:20 AM Invited
First-principles Study of the Phase Stability in the Equiatomic CrMnFeCoNi Alloy: Chin-Lung Kuo; Kang-Tien Hsieh; 1National Taiwan University

10:40 AM
Phase Stability and Chemical Short-range Order in W-Ta-Cr-V-Ti High-entropy Alloys and Their Derivatives from First-principles Modelling Based on Cluster-expansion Method: Damian Sobiera; Jan S. Wrobel; K.J. Kurzydlowski; 1Duc Nguyen-Manh; 2Warsaw University of Technology; 3United Kingdom Atomic Energy Authority

11:00 AM Invited
Core Structure of ½<111> Screw Dislocation in Ternary BCC High Entropy Alloys: First-principles Calculations: Ibrahim Alidin; Satish Rao; Christopher Woodward; Edwin Antillon; Triplicane Parthasarathy; 1UES Inc; 2Air Force Research Laboratory

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment — Interfacial Thermodynamics and Kinetics I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Monday AM | March 11, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Raymundo Arroyave, Texas A&M University; Yang Yang, East China Normal University

8:00 AM Introductory Comments

8:05 AM Keynote
William Hume-Rothery Award Recipient: Order within Disordered Materials — Insights into the Nature and Impact of Short-range Order in Concentrated Solid Solutions: Mark Asta; 1University of California, Berkeley; Lawrence Berkeley National Laboratory

8:40 AM Invited
Predicting the Interfacial Reactions Between Electrodes and Solid-state Electrolytes or Coatings: Gerbrand Ceder; 1University of California Berkeley

9:10 AM Invited
Modeling Transitions at Interfaces: Timofey Frolov; 1Lawrence Livermore National Laboratory

9:40 AM Break

10:00 AM Invited
Interface and Defect Free Energies from Atomistic Simulations: Rodrigo Freitas; 1Stanford University

10:30 AM Invited
Ramifications of Interfacial Compositional Phase Transformations: Stephen Foiles; 1Sandia National Laboratories
11:00 AM Invited
Asymmetric Line Segregation at Faceted Si Grain Boundaries: Christian Liesbersch; Andreas Stoffers; Masud Alam; Liverios Lymerakis; Oana Cojocaru-Mirechin; Baptiste Gautl; Jörg Neugebauer; Gerhard Dehm; Christina Schau; Dierk Raabe; 
1Max-Planck-Institut für Eisenforschung Gmb; 2RWTH Aachen University

11:30 AM Invited
Energetics of Non-stoichiometric Stacking Faults in Fe-Nb Alloys: An Ab Initio Study: Ali Zendegani; Fritz Körmann; Joerg Neugebauer; Tilmann Hicket; 1Mpi Fur Eisenforschung

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Föllies — Interatomic Potentials and Methods: A Joint Session with Computational Materials Discovery and Design

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Monday AM | March 11, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Elizabeth Holm, Carnegie Mellon University; Mikhail Mendelev, Ames Laboratory

8:00 AM Invited
Insights into Anharmonicity of Solids Using Moments: Murray Dow; 1Clemson University

8:30 AM
Advances in Atomic Methods for Material Design: Difan Zhang; Susan Sinnott; 1Penn State University

8:50 AM
Materials Dynamics Descriptors Determined by Data: Sven Rudin; 1Los Alamos National Laboratory

9:10 AM Invited
Development of Interatomic Potentials Using Physically-informed Artificial Neural Networks: Ganga P. Purja Pun; James Hickman; Rohit Batra; Rampi Ramprasad; Yuri Mishin; 1George Mason University; 2National Institute of Standards and Technology; 3University of Connecticut; 4Georgia Institute of Technology

9:40 AM Break

10:00 AM Invited
Beyond the Embedded Atom Method Era — the Future for Interatomic Potentials: William Curtin; R. Kobayashi; Daniele Giofre; Till Junge; Michele Ceriotti; 1Epfl Sti Igm Lamm; 2Nagoya Tech; 3EPFL

10:30 AM Invited
Rational Design of Classical Interatomic Potentials: Eugene Ragasa; R. Seaton Ulberg; Richard Hennig; Christopher O’Brien; Stephen Follies; Simon Philip; 1University of Florida; 2Sandia National Laboratories

11:00 AM Invited
Quantum Mechanics Based Bond-order Potentials and Fundamental Understanding of Dislocation Mediated Plasticity in Refractory Bcc Metals: Vactav Vitek; Yi-Shen Lin; 1University of Pennsylvania

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Pure and Binary Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharryya, ANSTO; Moshen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Monday AM | March 11, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Michael Short, Massachusetts Institute of Technology; Arun Devaraj, Pacific Northwest National Laboratory

8:00 AM Invited
Measuring Radiation Damage Using Stored Energy and Magnetism for Reactor Dose Measurement and Non-proliferation: Rachel Connick; Charles Hirst; Penghui Cao; Kangpyo So; Sara Ferry; R. Scott Kemp; Michael Short; 1Massachusetts Institute of Technology

8:30 AM
Phase Field Modeling of Irradiation-induced Compositional Patterning in Immiscible Binary Alloy Systems: Qun Li; Pascal Bellow; Robert Averback; 1University of Illinois Urbana Champaign

8:50 AM
Atomistic Modeling of Solute Redistribution in Radiation-resistant Solid Solutions: Craig Daniels; 2Pascal Bellow; Robert Averback; 1University of Illinois

9:10 AM
Anomalous Segregation Induced by Void-solute Interactions under Neutron Irradiation: First-principles Modeling and Experimental Validation in W(Re,Os,Ta): Duc Nguyen-Manh; Jan Wrobel; Michael Klimenkov; Sergei Dudarev; 1United Kingdom Atomic Energy Authority; 2Warsaw University of Technology; 3Karlsruhe Institute of Technology

9:30 AM Break

9:50 AM Invited
Irradiation Induced Composition Patterns and Segregation to Free Surfaces in Miscible Binary Solid Solutions: Anter El-Azag; Santosh Dubey; 2Purdue University; 3University of Petroleum and Energy Studies

10:20 AM
Binary Collision Approximation Modeling of Irradiation Damage: Irdina, an Alternative to SRIM: Jean-paul Crocombette; 2CEA Saclay DEN-SRMP

10:40 AM
Irradiation Induced Phase Transformation in Nanocrystalline Au: James Nathaniel; Pranav Suri; Jon Baldwin; Yongqiang Wang; Khalid Hattar; Nan Li; Mitra Taheri; 1Drexel University; 2Los Alamos National Laboratory; 3Sandia National Laboratory

11:00 AM
Quantification of 1D vs 3D Defect Migration Behavior in Ion Irradiated Dilute Copper Base Binary Alloys: Ling Wang; Arunodaya Bhattachrya; Chad Parish; Spencer Kropf; David Martin; Brian Wirth; Steven Zinkle; 1University of Tennessee; 2Oak Ridge National Laboratory
LIGHT METALS

Magnesium Technology 2019 — Keynote Session

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Monday AM | March 11, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama

8:00 AM Introductory Comments

8:10 AM Keynote
Magnesium Alloy Sheet for Transportation Applications: Christopher Romanowski1; 1Danieli FATA Hunter

8:55 AM Keynote
Magnesium for Automotive: Status and Challenges: Sarah Kleinebaum1; 1US Department of Energy

9:40 AM Break

10:00 AM Keynote
Magnesium Process and Alloy Development for Applications in the Automotive Industry: David Klaumuenzer2; 2Volkswagen AG

10:45 AM Keynote
Thermally Activated Slip in Rare Earth Containing Mg-Mn-Ce Alloy, ME10, Compared with Traditional Mg-Al-Zn Alloy, AZ31: Sean Agnew1; Vikas Bajjika2; Jishnu Bhattacharyya3; Nathan Peterson1; 1University of Virginia

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Corrosion and Compatibility!

Sponsored by: TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

Monday AM | March 11, 2019
008B | Henry B. Gonzalez Convention Center

Session Chair: Kumar Sridharan, University of Wisconsin

8:00 AM Introductory Comments

8:05 AM
Changing a Community’s Perception on the Viability of Chloride Salts as Heat Transfer Fluids for Concentrating Solar Power: Levi Irwin1; 1Mantech International

8:35 AM
Effect of Ni on the Corrosion Behavior of Haynes 230 Alloy in MgCl2-KCl Salt: Xuyang Peng1; Ramana Reddy2; 1University of Alabama; 2University of Science & Technology Beijing

8:55 AM
In Situ Proton Irradiation Slows Corrosion in Molten FLiNaK+Eu Salt: Weiyue Zhou1; Michael Short1; 1Massachusetts Institute of Technology

9:15 AM
Understanding Degradation of Structural Alloys in Molten Chloride Salts: Stephen Raiman1; Jake McMurray2; Richard Mayes3; Matt Kurley2; Jisu Moon2; Claudia Rawn1; 1Oak Ridge National Laboratory

9:35 AM Break

9:55 AM
Corrosion of High Entropy Alloy CrFeMnNi in Molten FLiBe Salt: Mohamed ElBahshawani1; William Doniger2; Cody Falconer3; Michael Moorehead1; Calvin Parkin1; Kumar Sridharan1; Adrien Couet1; 1University of Wisconsin Madison

10:15 AM
Carbon-metal Interactions in Molten FLiNaK: Kevin Chan1; Preet Singh1; 1Georgia Institute of Technology

10:35 AM
Corrosion of Hastelloy-N in Molten FLiNaK Salt at 700°C: Cody Falconer1; William Doniger2; Raluca Scarlat1; Kumar Sridharan1; Adrien Couet1; 1University of Wisconsin Madison

MATERIALS PROCESSING

Materials Processing Fundamentals — Modeling of Minerals and Metals Processing

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

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Session Chairs: Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis

9:00 AM Introductory Comments

9:05 AM
Dynamic Current and Power Distributions in a Submerged Arc Furnace: Yanatan Afework Tesfahunegn1; Thordur Magnusson2; Merete Tangstad3; Gudrun Saevarsdottir3; 1Reykjavik University; 2United Silicon; 3NTNU

9:25 AM
CFD Modeling of the Combustion and Heat transfer in the Top Submerged Lance Smelter: Daniele Obiso1; Sebastian Kriebitzsch2; Michael Stelter1; Markus Reuter2; 1CIC VIRTUHCON, TU Bergakademie Freiberg; 2TU Bergakademie Freiberg; 3HZDR, Freiberg

9:45 AM Break

10:05 AM
Modeling of Steel-slag-air Three-phase Flow in Continuous Casting Strand: Xubin Zhang1; Wei Chen1; Lifeng Zhang2; Piotr Scheller3; 1University of Science & Technology Beijing

10:25 AM
Dynamic Modeling of Unsteady Bulging in Continuous Casting of Steel: Zhe lin Chen1; Hamed Olia1; Brian Thomas2; Joseph Bentsman3; Bryan Petrus3; Madeline Rembold3; 1University of Illinois, Urbana-Champaign; 2Colorado School of Mine; 3Nucor Steel Decatur

10:45 AM
Modeling on the Two-phase Flow in a Slab Continuous Casting Strand using Euler-Euler Approach: Haichen Zhou1; Lifeng Zhang2; 1University of Science & Technology Beijing
11:05 AM
Flow Control in the Model of a Continuous Caster by using Contactless Inductive Flow Tomography: Ivan Glavinić1; Shereen Abouelazayem2; Matthias Ratajczak3; Dennis Schurmann4; Sven Eckert5; Frank Stefan6; Jaroslav Hláva7; Thomas Wondrak8; Harald Denner9; Ivan Glavinić1; Shereen Abouelazayem2; Matthias Ratajczak3; Dennis Schurmann4; Sven Eckert5; Jaroslav Hláva7; Thomas Wondrak8; Harald Denner9

11:25 AM
Optimization of the Flow Behavior of Molten Steel in Ultrahigh-speed Billet Continuous Casting Mold: Pei Xu1; Dengfu Chen2; Shixin Wu3; Hengsong Yu4; Mujun Long5; Sheng Yu6; Huamei Duan7; Chongqing University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Processing Effects

Sponsored by: TMS; Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Alktaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

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Session Chairs: Assel Alktaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory

8:00 AM Invited
Thermomechanical Processing to Improve the Fracture Toughness of HT-9 Steels for High-Dose Applications: Thak Sang Byun1; Timothy Lach2; Jung Pyung Choi3; Stuart Maloy4; 1Pacific Northwest National Laboratory; 2Los Alamos National Laboratory

8:30 AM
A Study on Tensile Behaviour and Microstructural Characteristics of Zircaloy-4 Processed through Swaging: Gaurav Singh1; Srinivasa Ratnesh2; Abhishek Tiwari3; R. Jayaganthan4; KI Narayanan5; Chander Arora6; Dinesh Srivastava7; IIT Madras; Nuclear Fuel Complex, Hyderabad; Nuclear Fuel Complex, Hyderabad

8:50 AM
Austenitic Oxide Dispersion Strengthened (ODS) Steels: Insights into their Microstructure and Mechanical Behavior: Ankur Chauhan1; Tim Gräning2; Dimitri Litvinov3; Michael Riether4; Anton Möslang1; Jarit Aktaa5; Karlsruhe Institute of Technology

9:10 AM
Development and Testing of Advanced Alloys for Very High Temperature and Dose Applications: Osman Anderoglu1; Madhavan Radhakrishnan2; Zhexian Zhang3; Md. Mehadi Hassan4; Eda Aydogan5; Connor Rietema6; Daniel Savage4; Justin Cheng6; Marko Knezević7; Amy Clarke2; Kester Clarke3; Nathan Mara4; Yongqiang Wang5; Stuart Maloy6; 1University of New Mexico; 2Los Alamos National Laboratory; 3University of New Hampshire

9:30 AM Break

9:50 AM Invited
Mechanical and Advanced Microstructural Analysis of Laser Beam Weldments Performed on Neutron-irradiated 304 Austenitic Stainless Steel: Jonathan Tatman1; Maxim Gussev2; Paula Freyer3; Frank Garner4; 1Electric Power Research Inst (EPRI); 2Oak Ridge National Laboratory; 3Westinghouse Electric Company; 4Texas A&M University

10:20 AM
Thermal Shock and In Situ Radial Strain Measurements: Delia Perez-Perez1; Sean McDeavitt4; Luis Ortega1; 1Texas A&M University

10:40 AM
Mechanical and Microstructural Characterization of Three HT-9 Heats (ORNL, LANL and EBR II) after Side-by-side Neutron Irradiation at LWR and Fast Reactor Relevant Temperatures: Ramprashad Prabhakaran1; Mychalio Toloczko2; Dan Edwards1; Kumar Sridharan1; 1Pacific Northwest National Laboratory; 2University of Wisconsin

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Grain Boundaries I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS; Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Monday AM | March 11, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Andrew Minor, University of California, Berkeley; Jason Trelewicz, Stony Brook University

8:00 AM
Effects of Elastic and Plastic Anisotropy on Grain Boundary Mediated Plasticity: A Phase Field Study: Jakub Mikula1; Siu Sin Quek2; Shailendra P.Joshi3; Tong Earn Tay4; Rajeev Ahiwalia5; 1A*Star; 2University of Houston; 3National University of Singapore

8:20 AM
Investigation of Deformation Mechanisms in Columnar Aluminium: Marissa Linne1; Ajey Venkataraman2; Michael Sangid3; Samantha Daly4; 1University of Michigan; 2Purdue University; 3University of California, Santa Barbara

8:40 AM Invited
Interface Defects Generated by Mechanical Loading Cause Early Fatigue Failure of Thin Cu Films: Cynthia Volkert1; 1University of Göttingen

9:10 AM Invited
A Framework for Grain Boundary Mode Selection via Compatible Shear Transformations: Ian Chesser1; Brandon Runnels2; Elizabeth Holm3; 1Carnegie Mellon University; 2National University of Singapore; 3University of Colorado, Colorado Springs

9:40 AM Break

10:00 AM
Mechanical Behavior and Strengthening Mechanisms of Nanotwinned Al Alloys: Xinghang Zhang1; Sichuang Xue2; Guang Li3; Yifan Zhang4; Jian Wang5; 1Texas A&M University

10:20 AM Invited
Defect Analysis and Evolution during In Situ TEM Nanomechanical Testing using Scanning Nanobeam Diffraction Imaging: Andrew Minor1; 1University of California, Berkeley

10:50 AM
Strength Statistics of Single Crystals and Metallic Glasses under Small Stressed Volumes: Yanfei Gao1; 1University of Tennessee
11:10 AM Invited Conservative Motion of Sources of Grain Boundary Dislocations: An Effective Mechanism for Shear-coupled Grain Boundary Migration. Anna Serra1; Pablo Garcia-Müller2; 1Universitat Politecnica de Catalunya; 2CIEMAT

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — High Temperature Micromechanics I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afroz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhrīti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday AM | March 11, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Verena Maier-Kiener, Montanuniversität Leoben; Jon Molina-Aldaregu, Imdea Materials Institute

8:00 AM Invited High-throughput Investigation of Strength and Creep in Mg Alloys through Micromechanical Testing: Jon Molina-Aldareguia; 1Imdea Materials Institute

8:25 AM Elevated Temperature Nanomechanical Characterization of Mg-nanocomposites: Meysam Haghsenas2; Devendra Verma2; Manoj Gupta2; 2University of North Dakota; 2Nanoscience Instruments; 2National University of Singapore

8:45 AM Understanding bcc Mg under Extreme Conditions of Pressure, Temperature and High Strain Rates: Manish Jain1; Marko Knezevic1; Nenad Velisavljevic1; Nathan Mara1; Irene Beyerlein1; Johann Michler1; Siddhartha Pathak1; 1University of Nevada, Reno; 1University of New Hampshire; 1Los Alamos National Laboratory; 1University of Minnesota, Minneapolis; 1University of California, Santa Barbara; 1EMPA Thun

9:05 AM A Versatile Shear-based Method to Study Mechanical Properties of Metals at Small Scales: Gan Feng1; Dinakar Sagapuram1; 1Texas A&M University

9:25 AM Break

9:45 AM Invited Temperature and Strain-rate Dependence of the Mechanical Behavior of Freestanding Gold Thin Films: Benoit Merte1; 1University Erlangen-Nürnberg (FAU)

10:10 AM Effect of Varying Interfaces on Strain Rate Sensitivity of Nanostructured Metals — A Case Study on Nickel. Oliver Rent1; Verena Maier-Kiener1; Daniel Kien1; Reinhard Pipp1; 1Erich Schmid Institute; 1Departement Physical Metallurgy and Materials Testing, Montanuniversität Leoben

10:30 AM Creep Behavior of Thermally Stable Nanocrystalline NiW Alloy using High Temperature Nanoindentation. Prince Singh1; Zhiyuan Liang1; George Pharr1; Maarten de Boer1; 1Carnegie Mellon University; 1Texas A & M University

10:50 AM Comparison of Soft Al-Zn-Mg-Cu and Hard W-Re Alloys: A High-Temperature Nanoindentation Study: Johann Kappacher1; Alexander Leitner2; Helmut Clemens2; Verena Maier-Kiener1; 1Department Physical Metallurgy and Materials Testing; 2Erich Schmid Institute for Materials Science

11:10 AM Real-time Deformation in Cold Sprayed Aluminum Alloy at Elevated Temperatures by In Situ Nanoindentation: Pranjal Nautiliy1; Cheng Zhang1; Victor Champagne2; Benjamin Boesl1; Arvind Agarwal1; 1Florida International University; 2U.S. Army Research Laboratory

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session I

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Rakesh Behera, Rochester Institute of Technology; Pavan Prabhakar, University Of Wisconsin-Madison; Rachesh Behera, Rochester Institute of Technology

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Session Chairs: Pratik Dholabhai, Rochester Institute of Technology; Pavan Prabhakar, University Of Wisconsin-Madison; Rachesh Behera, Rochester Institute of Technology

8:00 AM Introductory Comments

8:20 AM Invited Multi-scale Analysis for Predicting High-temperature Oxidation in Carbon/Carbon Ceramic Composites: Pavana Prabhakar1; Vinay Damodaran1; 1University of Wisconsin-Madison

8:40 AM Surface Stress Driven Bending of Nanoscale Composite Plates: P M Raghavendra1; Namrata Pachauri1; Anand Subramaniam1; 1Indian Institute of Technology Kanpur

9:00 AM Application of UMAT in Abaqus on Short Fiber Composite Mechanics: Yingsong Chen1; 1The Dow Chemical Company

9:20 AM Break

10:00 AM A Generalized Nature-Inspired Optimization Method: Additively Manufactured Materials with Superior Mechanical Performance: Mohammad Ghodrati1; Pinar Acor2; Reza Mirzaeifar1; 1Virginia Polytechnic Institute

10:20 AM Invited Atomic-scale Structure and Stability of Dopant-defect Complexes at Misfit Dislocations in Complex Oxide Heterostructures: Pratik Dholabhai1; 1Rochester Institute of Technology

10:40 AM A Simplified Composite Material Model to Evaluate Strip Twist/Warpage Mechanism and Major Factors in the Flip-chip Packaging Reflow Process: Ching-Yu Lee1; You-Fu Wu2; Amir Reza Ansari Dezfoli1; Wen-Dung Hsu1; Tai-Sheng Wang2; Yi-Dao Wang1; Guan-Han Lin1; Peng-Yuan Cheng1; 1National Cheng Kung University; 2Advanced Semiconductor Engineering Group

11:00 AM Bending Properties of Bio-inspired Nanocomposites: Raghuram Santhapuram1; Scott Muller1; Arun Nair1; 1University of Arkansas
ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Taoyuan, Taiwan; Hiroshi Nishikawa, Osaka University; Chih-Han Yang, National Cheng Kung University; Yuan Yu, Tsing Hua University; Yu-chen Liu, National Cheng Kung University; Shih-kang Lin, National Cheng Kung University; Yee-Wen Yen, National Taiwan University of Science and Technology.

Session Chairs: Chin-Ming Chen, National Chung Hsing University; Shih-kang Lin, National Cheng Kung University

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8:00 AM Invited
Phase Determination of Low-melting In-Bi Alloys on Cu Substrates: Albert T. Wu1, Chang-Meng Wang2; 1National Central University; 2SHENMAO Technology, Inc.

8:20 AM
Development of Sn-Bi-In-Ga Quaternary Low-temperature Solder: Chih-han Yang1; Shi-Qi Zhou2; Hiroshi Nishikawa3; Shih-Kang Lin4; 1National Cheng Kung University; 2Osaka University

8:40 AM
Interfacial Reactions in the Ga-doped Sn-0.7Cu/Cu Couples and Isothermal Sections of the Sn-Cu-Ga Ternary System: Chih-Han Yang1; Yu-chen Liu2; Yi-kai Kuo2; Shih-kang Lin1; 1National Cheng Kung University; 2University of Malaya

9:00 AM Invited
Reactive Dissolution of Metallic Nanoparticles during Reflow and Its Effects on Microstructure and Properties of Lead Free Solder Joints: A.S. Md Abdul Haseeb; 1University of Malaya

9:20 AM Break

9:40 AM
Improvement in Thermomechanical Reliability of Low Cost Sn-based BGA Interconnects by Cr Addition: Jung-Hwan Bang1; Dong-Yun Yu2; Yong-Ho Ko1; Hiroshi Nishikawa2; Chang-Woo Lee3; 1Korea Institute of Industrial Technology; 2Osaka University

10:00 AM
Reflowing Time Effect on Interfacial Reactions and Mechanical Properties between Sn-9wt%Zn, Sn-3.0wt%Ag-0.5wt%Cu Alloy Solder and Ag Substrate: Chia-Yu Liu1; Yu-Chun Li2; Chih-Ming Chen1; Ya-Jing Lee2; Ja-Ying Dail1; Yee-Wen Yen3; 1National Taiwan University of Science and Technology; 2National Chung Hsing University

10:20 AM
Formation and Growth of Intermetallic Compound Layer at Sn-Ag-Cu-Ni Solder/Cu Interface using Laser Process: Hiroshi Nishikawa1; Ryo Matsunobu2; 1Osaka University

10:40 AM
Exploring Effective Charge in Electromigration Effect Using Machine Learning: Yu-chen Liu1; Shih-kang Lin1; Dane Morgan2; 1National Cheng Kung University; 2University of Wisconsin, Madison

11:00 AM
Low-Temperature Bonding Using Silver Nanoparticles Paste for Electronics Packaging: Yu-Chi Fang1; Fan-Yi Ouyang2; 1National Tsing Hua University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhiril Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

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8:00 AM
Shuffle Dominant Phase Transformation in Metastable Beta Titanium Alloys: Yufeng Zheng1; Rajarshi Banerjee2; Dipankar Banerjee3; Hamish Fraser1; 1Ohio State University; 2University of North Texas; 3Indian Institute of Science

8:20 AM
Segregation and Phase Transformations along Superlattice Stacking Faults in Ni-based Superalloys and Its Effect on Creep Strength: Tim Smith1; Bryan Esser2; Brian Good3; Catherine Rae4; David McComb5; Michael Mills6; 1Glenn Research Center; 2Ohio State University; 3University of Cambridge

8:40 AM
Mechanical Response, Phase Transformation and Texture Evolution of Titanium Aluminide Processed by High-Pressure Torsion: Megumi Kawasaki1; Jae-Kyung Han2; X. Li3; Rian Dippenaar4; Klaus-Dieter Liss5; 1Oregon State University; 2University of Wollongong; 3Guangdong Technion - Israel Institute of Technology

9:00 AM
Compositional Influence on Microtube Formation in Ni-based Wires via the Kirkendall Effect: Haozhi Zhang1; Ashley Paz Y Puente2; 1University of Cincinnati

9:20 AM
Heat Treatment Strategies to Improve the Quasi Static and Dynamic Performance of Alpha-Beta Titanium Alloys: Alireza Fadavi Boostani1; Shiraz Mujahid2; Andrew L. Oppedal3; Cory Krivancic4; Wilburn R Whittington5; Paul G. Allison6; Jishnu J. Bhattacharyya7; Sean Agnew8; Haitham El Kadiri9; 1Center for Advanced Vehicular Systems; 2Mississippi State University; 3The University of Alabama; 4University of Virginia

9:40 AM Break

10:00 AM
Microstructural Evolution of Alpha Phase in High Strength Ti-5Fe-5Zr Alloy: Tomoyuki Homma1; 1Nagaoka University of Technology
10:20 AM
Determination of the Five Parameter Grain Boundary Character
Distribution of Nanocrystalline Alpha-zirconium Thin Films using
Transmission Electron Microscopy: Iman Ghamarian‡; Peyman
Samimi‡; Gregory Rohrer‡; Peter Collins‡; ¹University of Michigan;
²Texas A&M University; ³Carnegie Mellon University; 4Iowa State
University

10:40 AM
Aging Behavior of Alloy 625 Plus: Li-Jen Yu‡; Iman Ghamarian‡;
Grace Burke‡; Emmanuelle Marquis‡; ¹University of Michigan;
²University of Manchester

11:00 AM
Design of Heusler-strengthened NiTi-based Shape Memory
Alloys: Chuan Liu²; Gregory Olson¹; ¹Northwestern University

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals I

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy
Committee

Program Organizers: Giselle Azimi, University of Toronto; Hojong
Kim, Pennsylvania State University; Shafiq Alam, University of
Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale
Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara
Baba, University of Ilorin; Abdul Alabi, University of Ilorin;
Daud Olaoluwa, University of Ilorin; Daud Olaoluwa, University
of Ilorin; Abdulrasaq Jimoh, Central South University

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Session Chairs: Giselle Azimi, University of Toronto; Takanari
Ouchi, University of Tokyo

8:00 AM
Cesium Extraction from the Taron Deposit in Argentina: New
Developments: David Dreisinger¹; ¹University of British Columbia

8:35 AM
Feasibility of Copper Recovery from Spent Deposited Sludge
of Transformer Oil (DSTO) for Industrial Applications: Alafara Baba¹;
Joshua Ayodele¹; Oloduoowo Ameen¹; Abdurasaq Jimoh¹; Folahan
Adekola¹; Abdul Alabi¹; Marili Zuibaï¹; Kuranga Aynila¹; Abdulllah
Ibrahim³; Mustapha Raji¹; Daud Olaoluwa¹; Aisha Abdulkareem³;
Fausat Olasinde³; ¹University of Ilorin; ²Chemistry Advance
Research Centre, Sheda Science & Technology Complex, FCT,
Abuja

9:00 AM
Leaching and Recovery of an Oxide Concentrate using
Ammoniacal Thiosulfate Solutions: Zhonglin Dong²; Tao Jiang²; Bin
Xu²; Yongbin Yang²; Qian Li³; ¹Central South University

9:25 AM Break

9:45 AM
A Multi-step Process for the Cleaner Utilization of Vanadium-
bearing Converter Slag: Junyi Xiang³; Guishang Pei³; Qingyun
Huang³; Wei Lv³; Mingrui Yang³; Kai Hu³; Xuewei Lv³; ¹Chongqing
University

10:10 AM
Efficient Extraction of V(V) in Aqueous Solution by Microemulsion
System: Yun Guo¹; Danqing Li¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing
University

10:35 AM
A Novel Approach for Pre-concentrating Vanadium from
Stone Coal: Daya Wang¹; Baijun Yan¹; ¹University of Science and
Technology Beijing

11:00 AM
Study on the Roasting Mechanism of Vanadium-chromium Slag
with Sodium Hydroxide: Minmin Lin²; Chengjie Wang³; Bing Xie³;
Hong-Yi Li¹; ¹Chongqing University

ADVANCED MATERIALS

Refractory Metals 2019 — (I) Mo and Nb; (II) Co-Re,
Cr, and Nb-Si

Sponsored by: TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin;
Martin Heilmaier, KIT Karlsruhe; Kevin Jaansalu, Royal Military
College of Canada

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Session Chairs: Eric Taleff, University of Texas at Austin; Martin
Heilmaier, KIT Karlsruhe

8:00 AM
Correlating the Chemistry of Grain Boundaries in Molybdenum
with Their Deformation Behaviour Using Atom Probe Tomography
and Micromechanical Testing: Severin Jakob¹; Anna Ebner¹;
Alexander Leitner¹; Alexander Lorich¹; Michael Eidenberger-Schober¹;
Wolfram Knabl¹; Helmut Clemens¹; Verena Maier-Kiener¹;
³Montanuniversität Leoben, Department Physical Metallurgy
and Materials Testing; ²Montanuniversität Leoben, Department
Materials Physics; ¹Plansee SE

8:20 AM
Creep Substructure, Texture Evolution, and Dynamic Abnormal
Grain Growth in a Mo Rod Material: Philip Noel¹; Eric Taleff²;
¹Sandia National Labs; ²The University of Texas at Austin

8:40 AM
Damage Initiation due to Efficient Generation, Stabilization
and Transport of Vacancies in Body-centred-cubic Niobium
Containing Oxygen Impurities: Qing-Jie Li¹; Howard Sheng²; Ju Li²;
Evan Ma³; Johns Hopkins University; ²George Mason University;
³Massachusetts Institute of Technology

9:00 AM
Hot Isostatic Pressing of Niobium-based Refractory Alloys:
Calvin Miller¹; Brian Welk¹; Gopal Viswanathan¹; Benjamin Georgi³;
Zachary Kloeene¹; Kevin Chaput²; John Foltz³; Hamish Fraser³;
1The Ohio State University; 2Air Force Research Laboratory; 3ATI
Specialty Alloys and Components

9:20 AM
Elevated-temperature Tensile Behavior of Niobium: Emily Brady¹;
Eric Taleff¹; ¹University of Texas Austin

9:40 AM Break

9:50 AM
The Influence of C/Ta Ratio on Nanosized TaC Precipitates and
Co Matrix in HighTemperature Co-Re Based Alloys
Studied by Neutrons and X-rays: Ralph Gilles¹; Lukas Karge¹;
Debashis Mukherji³; Pavel Strunz²; Premek Beran³; Michael
Hofmann³; Andreas Stark³; Joachim Roesler³; ¹Tu Muenchen;
²TU Braunschweig; ³Nuclear physics institute of the CAS; 4Helmholtz
Zentrum Geesthacht

10:10 AM
Microstructure Evolution in Ni-containing Co-Re-Cr Alloys
and Effects on Alloy Properties: Katharina Esleben¹; Bronislava
Gorr¹; Hans-Jürgen Christ¹; Debashis Mukherji³; Joachim Rössler³;
¹Universität Siegen; ²TU Braunschweig

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10:30 AM
Microstructure and Oxidation Behavior of Heat-treatable Cr-based Alloys: Mathias Galetz1; Anke Ulrich1; Petra Pfizenmeier1; Uwe Glatzel1; 1DECHHEMA Forschungsinstitut

10:50 AM
Mechanically Activated Combustion Synthesis of Niobium Silicide Based Composites: Reino Trevino1; Edgar Maguregui1; Evgeny Shafirovich1; 1University of Texas at El Paso

11:10 AM
Influence of Composition of Nb-Si Based Alloy Substrates on the Microstructure and Oxidation Performance of Their Si-Al-Y Diffusive Coatings Prepared by Pack Cementation Technique: Guo Xiping1; Luo Yucheng2; Yao Chengzh1; Qiao Yanqiang1; 1Northwestern Polytechnical University

ENERGY & ENVIRONMENT

REWAS 2019: Disruptive Material Manufacturing - Scaling and Systems Challenges

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Kaka Ma, Colorado State University; Iver Anderson, Iowa State University / Ames Laboratory; Sneha Prabha Narra, Worcester Polytechnic Institute; Fiseha Tesfaye, Åbo Akademi University; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

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Session Chairs: Kaka Ma, Colorado State University; Sneha Prabha Narra, Worcester Polytechnic Institute

8:00 AM Introductory Comments

8:05 AM Invited
Metal Additive Manufacturing and Sustainable Materials Development: A Case Study in the Application of Alternative Feedstock Materials: Parnian Kiani1; Katherine Terrassa1; Blake Fullenwider1; Kaka Ma2; Julie Schoenung2; 1University of California, Irvine; 2University of Colorado State University

8:30 AM Invited
From Waste Steel to Weapons: Agile Production Enabled by Additive Manufacturing: Jianyu Liang1; Richard Sisson1; Diran Apelian1; 1Worcester Polytechnic Institute

8:55 AM
From Recycled Machining Waste to Useful Powders for Metal Additive Manufacturing: Kaka Ma1; 1Colorado State University

9:15 AM
Use of Non-spherical Hydride-DeHydride (HDH) Powders in Powder Bed Fusion Additive Manufacturing: Zheng Wu1; Rahi Patel1; Joe Capone1; Muktesh Paiwal1; Jack Beuth1; Anthony Rollett1; Sneha Prabha Narra1; 1Carnegie Mellon University; 1Ametak Specialty Metal Products; 1Worcester Polytechnic Institute

9:35 AM Break

9:55 AM
Recycling in Supply Chains for Tomorrow’s Low-carbon Industries: Adam Powell1; 1Worcester Polytechnic Institute

10:15 AM
The Role of Manufacturing Variability on Environmental Impact: Alexander van Grootel1; Jiyoun Chang1; Elsa Olivetti2; 1Massachusetts Institute of Technology

10:35 AM
Manufacturing Materials Optimization Research at The REMADE Institute: Pradeep Rohaoti1; Alan Luo1; Magdi Azer2; 1University of Wisconsin; 2Ohio State University; 3University of Illinois

10:55 AM
Sustainable Nitrogen-based Fertilizer Production from Sun, Air, and Water: Stephan Petersen1; Dorottya Gubani2; Martin Roeb2; Josua Vieter1; Hanna Krüger1; Klaus Hack2; Tatjana Jantzen2; Martin Habermann2; Markus Hufschmidt3; 1GT Technologies; 2German Aerospace Center (DLR); 3aixprocess

11:15 AM
Metamorphic Manufacturing: Shaping the Future of On-Demand Components: Glenn Doehn1; George Spanos2; 1The Ohio State University; 2The Minerals, Metals, and Materials Society (TMS)

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell’s 80th Birthday — Entrainment and Bifilms

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Murat Tiryakioğlu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Monday AM | March 11, 2019
006B | Henry B. Gonzalez Convention Center

Session Chair: Murat Tiryakioğlu, University of North Florida

8:00 AM Introductory Comments

8:10 AM Keynote
Update on Bifilms - The Fundamental Defect in Metals: John Campbell1; 1University of Birmingham, UK

8:40 AM
Entrainment Defects in Cast Iron: Zakherya Nashwan1; William Griffiths1; 1University of Birmingham, UK

9:05 AM
Measurement of Air Entrainment During Pouring of an Aluminum Alloy: Lucas Archer1; Francisco Guerra1; Christoph Beckermann1; 1University of Iowa

9:30 AM
Connecting Oxide Bifilms’ Properties from Atomistic Simulations with Virtual Casting of Aluminum: Jialin Liu1; Qigui Wang1; Yue Qi1; 1Michigan State University; 2General Motors Corporation

9:50 AM Break

10:10 AM
Numerical Process Modelling and Simulation of Campbell Running Systems Designs: Chengcheng Lyu1; Michail Papanikolaou; Mark Jolly1; 1Cranfield University

10:30 AM
Synchrotron X-ray Real-time Studies of the Nucleation and Growth of Intermetallic Phases in Solidification: Jiawei Mi1; 1University of Hull

10:50 AM
Determination of Liquid Metal Quality with Deep Etching Method: Furkan Tezer1; Özen Gürsoy1; Mert Zoraga1; Eray Erzi1; Derya Dispina1; 1Istanbul University
11:10 AM
Effect of Fe-Rich Intermetallics on Tensile Behavior of Al-Cu
206 Cast Alloys at Solid and Near-Solid States: Kun Liu1; X.
Cao2; A. Bolouri1; X. G. Chen3; 1University of Quebec; 2Aerospace
Manufacturing Technology Center, National Research Council
Canada; 3University of the West of England

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn —
Grain Refinement

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian,
RMIT University (Royal Melbourne Institute of Technology);
John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort,
Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Monday AM | March 11, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Mark Easton, RMIT University; Peter Schumacher,
University of Leoben

8:00 AM Introductory Comments

8:10 AM Keynote
Heterogeneous Nucleation Sequence at the Interface of TiB2 to
Form Al: Jiehua Li1; Peter Schumacher2; 1Montanuniversität Leoben

8:30 AM Keynote
Recent Advances in Understanding Early Stages of Solidification:
Zhongyun Fan1; 1Brunel University

8:50 AM Invited
A Brief History of Grain Refinement: Mark Easton2; Ma Qian3;
Michael Bermingham2; Peng Cao2; 2RMIT University; 3University of
Queensland; 2University of Auckland

9:10 AM Invited
Revealing the Heterogeneous Nucleation and Growth Behaviour
of Grains in Inoculated Aluminium Alloys during Solidification:
Yijiang Xu1; Ragnvald Mathiesen1; Daniele Casar1; Yanjun Li1;
1Norwegian University of Science and Technology

9:30 AM Break

9:50 AM Invited
Heterogeneous Nucleation in Peritectic Systems: John Perepezko1;
Rohit Trivedi1; 1University of Wisconsin; 1Iowa State University

10:10 AM Keynote
Thermodynamics of Carbon and Carbides for Grain Refinement
of Mg-alloys: Rainer Schmid-Fetzer1; 1Clausthal University of
Technology

10:30 AM Invited
Crystallography of Phase Transformations in Solids and its
Applications: Ming-Xing Zhang1; 1University of Queensland

10:50 AM Invited
Grain Refinement of Aluminum: A Review and Unsolved Mysteries:
Geoffrey Sigworth1; 1GKS Engineering Services

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and
Modeling — Session I

Sponsored by: TMS Functional Materials Division, TMS Structural
Materials Division, TMS: Advanced Characterization, Testing, and
Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering;
Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang,
Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia
Institute of Technology; Dhiren Bhattacharyya, Australian Nuclear
Science and Technology Organization

Monday AM | March 11, 2019
301A | Henry B. Gonzalez Convention Center

Session Chairs: Saurabh Puri, Microstructure Engineering; Amit
Pandey, Granta Design/ANSYS

8:00 AM Introductory Comments

8:10 AM Keynote
Evolving Methods in the Measurement of Micromechanical
Properties of Materials: Robert Wheeler1; Amit Pandey2; Amit
Shyam3; Thomas Stoughton4; Michael Uchic5; Paul Shade6; Lisa
Rueschhoff7; matthew dickerson8; Mark Flores9; Nathaniel Sesar10;
Torin Quick11; Andrew Shartis12; 1MicroTesting Solutions LLC; 2LG
Fuel Cell Systems; 3Oak Ridge National Laboratory; 4General
Motors Research and Development Center; 5Air Force Research
Laboratory

8:50 AM Invited
In Situ Instrumentation and Microfabrication for Mechanical
Testing of Thin Films at Elevated Temperatures: Gi-Dong Sim1;
Joost Vlassak2; 3KAIST; 4Harvard University

9:20 AM
A Novel MEMS Stage for In Situ Thermomechanical Testing
of Materials under Bending: Mohamed Elhebeary1; Taher Saïf2;
1University of Illinois at Urbana-Champaign

9:40 AM Break

10:00 AM Invited
An Overview of the Research on TiAl Alloys: From Fundamental
To Applications: Seong-Woong Kim1; Ji Young Kim2; Taegu Lee3;
Seung-Hwa Ryu4; Eun Soo Park5; Jae Keun Hong6; Seung Eon Kim7;
1Korea Institute of Materials Science; 2Korea Institute of Materials
Science; Seoul National University; 3Korea Advanced Institute of
Science and Technology; 4Seoul National University

10:30 AM
Mechanical Behavior of Nanocrystalline NiTi Films with High-Low
Controlled Microstructures – Ex Situ and In Situ TEM Experiments:
Paul Rasmussen1; Rohit Sarkar1; Jagannathan Rajagopalan2;
1Arizona State University

10:50 AM
Mechanical Properties Evaluation of Irradiated Duplex Stainless
Steel by Nano Indentation and In Situ Nano Pillar Compression
Test: Hyunsu Do3; Hyeonsung Kim1; Changheui Jang1; Dongchan
Jang1; 1Kaist

11:10 AM
Deformation-Induced Martensitic Transformation in 304
Stainless Steel using In Situ TEM characterization: Effect of Ion
Irradiation: Djamel Khoumi1; Francois-Ligori Paul2; 1North Carolina
State University; 2Phelma
MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Energy Efficient Clean Metallurgical Technologies

**Sponsored by:** TMS: Pyrometallurgy Committee

**Program Organizers:** Tao Jiang, Central South University; Jianhui Yang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baqun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinlikci, Atılım University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Monday PM | March 11, 2019
208 | Henry B. Gonzalez Convention Center

**Session Chairs:** Shijie Wang, Río Tinto Kennecott Utah Copper Corp; Yuanbo Zhang, Central South University

2:30 PM Introductory Comments

2:35 PM

**Waste Toner Powder, a Potential Resource for Iron and Steelmaking Technologies:** James Dankwah; Yvonne Owusu-Ansa; 1University of Mines and Technology

2:55 PM

**Preparation of High-carbon Metallic Briquette for Coke Saving in Blast Furnace:** Huiqing Tang; Shihong Liu; 2University of Science & Technology Beijing

3:15 PM

**Study on the Migration of Alkali Metals in the Synthesis Process of Vanadium–Nitrogen Alloy:** Deman Liu; Jiang Diao; Guang Wang; Bing Xie; 1Chongqing University

3:35 PM

**Study of Siderite Fluidization Magnetization Roasting-magnetic Separation:** Zhao Qiang; Xue Jilai; 1University of Science and Technology Beijing

3:55 PM Break

4:15 PM

**Strengthening Sodium Stannate Preparation from Cassiterite Concentrates and Na2CO3 Roasted in a Weak Reductive Atmosphere:** Yuanbo Zhang; Benlai Han; Zijian Su; Bingbing Liu; Manman Lu; 1Central South University

4:35 PM

**Emission Profile of PM10 and PM2.5 in Iron Ore Sintering Process and Control Technology:** Zhiyun Ji; Xiaohui Fan; Min Gan; Xuling Chen; Wei Lv; Guojing Wang; Tao Jiang; 1Central South University

4:55 PM

**The Influence Mechanism of Nb on Hot Charging Crack in X60 Pipeline Steel:** Ping Sheng; Yanxin Wu; Juan Cheng; Qiankun Yang; Dong Zhang; Yang Wang; Jianxun Fu; 1Shanghai University

5:15 PM

**Viscosity Properties of Mold Flux under Low Frequency Electromagnetic Field:** Wei Qian; Yu Wang; Lu-ming Zhao; 1Chongqing University

5:35 PM Concluding Comments

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Process and Waste Gas Operations

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee

**Program Organizers:** Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, CSIRO; John Howarter, Purdue University; Neale Neelameggham, IND LLC

Monday PM | March 11, 2019
007D | Henry B. Gonzalez Convention Center

**Session Chair:** John Howarter, Purdue University

2:30 PM

**CO2 Utilization in the Refining Process of FeCr and FeMn:** Haijuan Wang; Xuan Wei; Cheng Li; 1University of Science and Technology Beijing

2:50 PM

**Flare Gas Reduction by Connecting the Flash Gas Compressors as Series:** Farhad Fazlollahi; 1Purdue University/WorleyParsons Company

3:10 PM

**High-temperature Online Reforming of Converter Gas with Coke Oven Gas:** Binglang Ren; Lin Lin; Jingsong Wang; 1University of Science and Technology Beijing

3:30 PM

**Simultaneous CO2 Sequestration of Korean Municipal Solid Waste Incineration Bottom Ash and Encapsulation of Heavy Metals by Accelerated Carbonation:** Thriveni Thenepalli; Ramakrishna Chilakala; Ahn Ji Whan; 1Hanil Cement Co Ltd; 2Korea Institute Of Geosciences And Miner

3:50 PM

**Promoting Behaviors of Alkali Carbonates during CO2 Capture of Lithium Orthosilicate:** Qian Xu; 1Shanghai University, China
SPECIAL TOPICS
2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Metal Refining

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Monday PM | March 11, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Kinnor Chattopadhyay, University of Toronto; M Akbar Rhamdhani, Swinburne University of Technology

2:30 PM Invited
Machine Learning Approaches to Describe and Classify Nonmetallic Inclusions in Steel: Mohammad Abdulsalam; Bryan Webler; Carnegie Mellon University

3:00 PM Invited
The Effects of FeO and Sulphur Concentration on the Spontaneous Emulsification of a Free Steel Droplet Suspended in Slag: Stephen Spooner; J. M. Warnett; M. A. Williams; Sridhar Seetharaman; Z Li; University of Warwick; Colorado School of Mines

3:30 PM Invited
Microstructural Observation of Oxidised End-of-life Rare Earth Magnet: Muhammad Firdaus; M Akbar Rhamdhani; Kathie McGregor; Mark Pownceby; John Rankin; Swinburne University of Technology; CSIRO

4:00 PM Break

4:20 PM Invited
Effect of Surface Active Elements on the Interaction between Refractory and Steel: Limei Cheng; Lifeng Zhang; Ying Ren; Wen Yang; University of Science & Technology Beijing

4:50 PM Invited
Integration of Biomass Gasification in a Mixing Agent of CO₂ and H₂O and Waste Heat from Hot Slags: Yongqi Sun; The University of Queensland

5:10 PM
Reaction Behavior of Al-killed Medium-manganese Steel with MgO Refractory: Zhiyin Deng; Lingzhong Kong; Liu Cheng; Miaoyong Zhu; Northeastern University

5:30 PM
Effects of a Top-down Flow on Gas-solid Fluidization State in a Bubble Fluidized Bed: Xu Han; Liangying Wen; Shengyun Shi; Jiao Cao; Wenhuan Jiang; Meihuan Liu; Feng Lu; Jian Xu; Shengfu Zhang; Chongqing University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Monday PM | March 11, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Jin-Seong Park, Hanyang University; Jeffrey Elam, Argonne National Laboratory

2:30 PM Invited
Sequential Infiltration Synthesis for Functional Nanomaterials: Jeffrey Elam; Argonne National Laboratory

3:00 PM Invited
Atomic Layer Deposition (ALD) on Cellulosic Products for New Functional Materials: Mark Losego; Georgia Tech

3:30 PM
Improving Stability and Performance of Photoelectrochemical Water Splitting on Solution-processed Organic Semiconductor Thin Films by Ultrathin Metal Oxide Passivation via Atomic Layer Deposition: Chang-Yong Nam; Brookhaven National Laboratory

3:50 PM Break

4:10 PM Invited
Ultra-thin Films Deposited by Atomic Layer Deposition (ALD) for Organic – Inorganic Perovskite Solar Cells and Photoelectrochemical Cells: Hyunjung Shin; Sungkyunkwan University

4:40 PM Invited
Recent Progress on Metal Oxide Semiconductor Thin Film Transistor Applications via Atomic Layer Deposition Method: Jin-Seong Park; Hanyang University

5:10 PM
Ambipolar Behavior Owing to ALD In-situ DEZ Treatment on In0.53Ga0.47As MOSFETs Devices: Heber Hernandez Arriaga; Jiyoung Kim; The University of Texas at Dallas

5:30 PM
Realization of Spatially Addressable Library using Raman as Combinatorial Approach on Atomic Layer Deposition: Harrison Kim; Si Joon Kim; Jaebeom Lee; Antonio Lucero; Jiyoung Kim; University of Texas at Dallas

5:50 PM
Investigation of Hollow Cathode Plasma Enhanced Atomic Layer Deposition of Silicon Nitride (SiNx) Thin Films: Su Min Hwang; Antonio Lucero; Harrison Kim; Aswin Kondusamy; Si Joon Kim; Jiyoung Kim; The University of Texas at Dallas
ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs I

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday PM | March 11, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Amit Pandey, Granta Design/ANSYS; Soumendra Basu, Boston University

2:30 PM Invited
Electrophoretically Deposited Copper Manganese Spinel Coatings for Prevention of Chromium Poisoning in Solid Oxide Fuel Cells: Zhihao Sun1; Ruofan Wang1; Uday Pal1; Srikanth Gopalan1; Soumendra Basu1; 1Boston University

2:55 PM
Observations on Accelerated Oxidation of a Ferritic Stainless Steel under Dual Atmosphere Exposure Conditions: Michael Reisert1; Ashish Aphale1; Prabhakar Singh1; 1University of Connecticut

3:15 PM
High-temperature Oxidation Behavior of Additive Manufactured Inconel 625: Sedigheh Rashidi1; Amit Pandey1; Rajeev Gupta1; 1University of Akron; 2LG Fuel Cell Systems

3:35 PM
Cathode Poisoning and Mitigation in the Presence of Combined Cr and S Contaminants in SOFC: Junsung Hong1; Su Jeong Heo1; Ashish N. Aphale1; Boxun Hu1; Prabhakar Singh1; 1University of Connecticut

3:55 PM Break

4:15 PM
Coatings for Metallic Components of Solid Oxide Fuel Cell Systems: Manj Mahapatra1; Mark King1; 1University of Alabama at Birmingham

4:35 PM Invited
Self-cleaning Cathodes for Endurance to Chromium Poisoning: Michelle Sugimoto1; Zhikuan Zhu1; Uday Pal1; Soumendra Basu1; Srikanth Gopalan1; 1Boston University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries I

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday PM | March 11, 2019
223 | Henry B. Gonzalez Convention Center

Session Chairs: Partha P. Mukherjee, Purdue University; Leela M. R. Arava, Wayne State University

2:30 PM Keynote
Battery Performance and Safety Aspects of Imposed Thermal Gradients: Rachel Carter1; Connor Fear2; Aashutosh Mistry2; Partha Mukherjee2; Corey Love2; 1U.S. Naval Research Laboratory; 2Purdue University

3:00 PM
First Principles Calculations of Oxygen Diffusion in LSGM: Abhinav Jain1; Dallas Trinkle1; Ran Gao2; Lane Martin2; 1University of Illinois Urbana Champaign; 2University of California Berkeley

3:20 PM
Hollow Sn Microspheres for Lithium-ion Battery: Fuqian Yang1; 1University of Kentucky

3:40 PM Keynote
Critical Size Scale and Effects of Transport Gradients on Plating in Li-ion Batteries: Craig Arnold1; 1Princeton University

4:10 PM Break

4:30 PM Invited
Toward New Electrode Materials for Energy Storage Devices: Synthesis via Chemical Pre-intercalation Approach: Ekaterina Pomerantseva1; 1Drexel University

4:55 PM
Mechanical Properties of Lithium Metal at the Macro- and Micro-scale: Cole Fincher1; Daniela Ojeda1; Matt Pharr1; 1Texas A&M University; 2University of Central Florida

5:15 PM
Bi2Mn4O10/C-N Nanocomposite as a New Sodium-Ion Battery Anode Material: Jing Zhan1; Yiyu Long1; 1Central South University
ADDITIVE TECHNOLOGIES

Additive Manufacturing Joint Keynote Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizer: Ryan Dehoff, Oak Ridge National Laboratory

Monday PM | March 11, 2019
Lila Cockrell Theater | Henry B. Gonzalez Convention Center

2:30 PM Introductory Comments

2:35 PM Keynote
Solidification of Superalloys: From Single Crystals to Additive Manufacturing: Andrew Polonsky; Tresa Pollock; 1University of California Santa Barbara

2:40 PM Keynote
Optimizing the Performance of Additively Manufactured Ti Alloy Components: Brian Welk1; Samuel Kühn2; Hamish Fraser3; 1The Ohio State University

2:45 PM Keynote
Printable Alloys by Design: Gregory Olson1; 1Northwestern University & QuesTek Innovations LLC

4:05 PM Break

4:20 PM Opportunities in Machine Learning for Additive Manufacturing: Elizabeth Holm1; 1Carnegie Mellon University

4:55 PM Keynote
Solidification and Solid-state Transformations during Metal Additive Manufacturing under Thermo-mechanical-chemical Transients: Sudarsanam Babu1; 1The University of Tennessee, Knoxville

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session II

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Monday PM | March 11, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: Wolfgang Pantleon, Technical University of Denmark; Reza Alizadeh

3:00 PM Understanding Deformation Near Nanoscratches using HR-EBSD Measurements and CP-FEA Simulations: Anna Kareek1; Edmund Tarleton1; Sarah Hainsworth2; Angus Wilkinson1; 1University of Oxford; 1Aston University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Alloy Development and Application of Magneto-thermal Materials

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, NASA GRC; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Monday PM | March 11, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Ryan Ott, Ames Laboratory

3:20 PM Accelerated Dictionary Based EBSD Indexing: William Lenthe1; Saransh Singh2; Marc De Graef3; 1Carnegie Mellon University

3:40 PM A Multi-scale Characterization of Strain Localization in Ni-based Superalloys – combined HEDM and Dark Field X-ray Microscopy: Sven Gustafson1; Wolfgang Ludwig2; Paul Shade4; Diwakar Naragani1; Darren Pagan2; Carsten Detlefs3; Michael Sangid4; 1Purdue University; 2European Synchrotron Radiation Facility; 3Air Force Research Laboratory; 4Cornell High Energy Synchrotron Source

4:00 PM Break

4:20 PM Quantifying Grain Size and Shape in Anisometric Structures by the Orientation Correlation Function: Wolfgang Pantleon1; 1Technical University of Denmark

4:40 PM Robust Methodology for Combining High-energy X-ray Diffraction and 3D Electron Microscopy Methods to Elucidate Evolving Plastic Response of Polycrystalline Alloys: Kelly Nygren1; McLean Echlin; Andrew Polonsky1; Joseph Wendorf1; Jean-Charles Stivinville1; Patrick Callahan1; Tresa Pollock2; Eric Miller3; Matthew Miller1; 1Cornell High Energy Synchrotron Source; 2University of California Santa Barbara; 3Tufts University; 4Cornell University

5:00 PM Elucidating the Role of Localized Deformation on Hydrogen Environment-assisted Cracking Susceptibility in a Precipitation-hardened Ni-base Superalloy: Zachary Harris1; James Burns2; 1University of Virginia

5:20 PM Characterization of Intragranular Deformation and Damage: Veronica Livescu1; Cheng Liu1; Bineh Ndefru1; Ramon Martinez2; Curt Bronkhorst1; George Gray III1; 1Los Alamos National Laboratory

5:40 PM Customized Polarized Optical Microscope for Determining C-axis Orientation of Alpha-titanium: Ke-Wei Jin1; William Lenthe2; Marc De Graef3; 1Carnegie Mellon University

2:30 PM Invited
A New Quantitative Criterion to Determine the Order of Phase Transitions: Application to Different Materials: Victorina Franco1; Jia Yan Law2; Alejandro Conde1; 1Universidad De Sevilla
3:00 PM Invited
Advantages and Disadvantages of Additive Manufacturing of Magnetocaloric Materials and Magnetic Shape Memory Alloys: Markus Chmielus; 1University of Pittsburgh

3:30 PM Invited
Magnetic Cooling and Energy Harvesting Materials and Systems; Raju Ramanujan; 1Nanyang Technological University

4:00 PM Break

4:20 PM Invited
Materials for Efficient Energy Conversion; Ekkes Brueck; 1Delft University of Technology

4:50 PM
Optimization of Magnetocaloric Properties of Ball-Milled La(Fe, Co, Si)13(H,C)13y; Lotfi Bessais; 1University of Pennsylvania; 2Peking University; 2Toshiba Corporation Manufacturing Engineering Center; 1Toshiba Corporation Manufacturing Engineering Center; 2Imperial College London

5:10 PM
The Effect of Additional Elements on the High-temperature Magnetocaloric Property of MnFe-based Alloys; A-Young Lee; Song-Yi Kim; Young-Do Kim; Min-Ha Lee; 1Korea Institute of Industrial Technology; 2Hanyang University

5:30 PM
Magnetocaloric Properties in Additive Manufactured Ni-Mn-Ga-Cu; Erica Stevens; 1Katerina Kimes; 1Daniel Salazar; 2Rafael Rodriguez; 2Aaron Acierio; 2Patricia Lazpita; 2Volodymyr Chernenko; 1Markus Chmielus; 1University of Pittsburgh; 2Basque Center for Materials, Applications, and Nanostructures

5:50 PM
Crystal Structure, Magnetization and Elastic Moduli of the Tb0.2Dy0.8Co2 Compound; Dan Huang; 1Jianrong Gao; 2Jiaqiang Yan; 2David Mandrus; 2Veerle Keppens; 1Northeastern University, China; 2Oak Ridge National Laboratory; 1University of Tennessee at Knoxville

ELECTRONIC MATERIALS
Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Solder Joint Intermetallics

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, National Central University; Albert T. Wu, National Energy Technology Laboratory; P. Chris Pistorius, US Department of Energy

Monday PM | March 11, 2019
216A | Henry B. Gonzalez Convention Center

Session Chair: Kazuhiro Nogita, The University of Queensland; Sergey Belyakov, Imperial College London

2:30 PM Invited
Nucleation and Cyclic Twinning of Tin Droplets on Single Crystal Intermetallic Compounds; Christopher Gourlay; 1Zhaolong Ma; 2Jingwei Xian; 2Sergey Belyakov; 1Imperial College London

3:00 PM
Effects of CuZnAl Memory Particles on the Microstructures and Property of Cu/Sn/Cu Solder Joints; Liang Zhang; 1Jiangsu Normal University

3:20 PM
Orientation Relationships Between Cu6Sn5 and Ni3Sn4 in Electronic Solder Joints; Yuchen Hsu; 1Jingwei Xian; 2Christopher Gourlay; 2Toshiba Corporation Manufacturing Engineering Center; 1Imperial College London

3:40 PM
Phase Transformation Induced Cracking in Solder Joints Containing Cu6Sn5; Flora Somidin; 1Hiroshi Maeno; Quy Tran Xuan; 1Stuart McDonald; 2Mohn Arif Anuar Mohd Salleh; 2Xiaozhao Ye; 2Syo Matsumura; 2Kazuhiro Nogita; 1Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM), School of Mechanical and Mining Engineering, The University of Queensland; 1The Ultramicroscopy Research Center, Kyushu University; 2Department of Applied Quantum Physics and Nuclear Engineering, Kyushu University; 1Centre of Excellence Geopolymer and Green Technology, School of Materials Engineering, Universiti Malaysia Perlis (UniMAP), Taman Muhibbah

4:00 PM Break

4:20 PM Invited
The Evolution of IMCs in Sn-based Solder Joints with Au/Ni/Cu Pads under Current Stressing; Fu Guo; 1Yu Tian; 1Limin Ma; 1Yishu Wang; 1Beijing University of Technology

4:50 PM
Mechanical Assessment of Hexagonal-Cu6Sn5, Intermetallics and Multilayered Structures in Cu/Sn Joints Using Micro-Compression; Jui-Yang Wu; 1C. Robert Kao; 1National Taiwan University

5:10 PM
Interfacial Reaction between Copper-tin Couple under High Pressure Environment: Kuo-Shuo Huang; 1Albert T. Wu; 1National Central University

5:30 PM
Twinning and Refinement of Cu6Sn5 in Ni-containing Solders; Jingwei Xian; 1M.A.A. Mohd Salleh; 2Sergey Belyakov; 2Te-Cheng Su; 2Guang Zeng; 2Kazuhiro Nogita; 2Hideyuki Yasuda; 2Christopher Gourlay; 1Imperial College London; 3Universiti Malaysia Perlis (UniMAP); 3The University of Queensland; 4Kyoto University

CHARACTERIZATION
Advanced Real Time Imaging — Energy, Fuels, and Environment

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yong-sung Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Monday PM | March 11, 2019
302B | Henry B. Gonzalez Convention Center

Session Chair: Zuotai Zhang, Southern University of Science and Technology

2:30 PM Invited
Rapid Radiation Damage Characterization with In Situ Dual Heterodyne Transient Grating Spectroscopy; Cody Dennett; Sara Ferry; 2Kangpyo So; 2Khalid Hattar; 2Daniel Buller; 2Kuba Anglin; Michael Short; 1Massachusetts Institute of Technology; 2Sandia National Laboratory
3:00 PM Invited
In Situ Transmission Electron Microscopy Characterization of Irradiation Damage in Novel Nuclear Materials: Osman El-Atwani; Stuart Maloy; Los Alamos National Laboratory

3:30 PM
In Situ Structural Variations of Individual Particles of an Al2O3-Supported Cu/Fe Spinel Oxygen Carrier during High-temperature Oxidation and Reduction: W. H. Harrison Nedell; Anna Nakano; Jinichiro Nakano; James Bennett; National Energy Technology Laboratory/ORISE; National Energy Technology Laboratory/AECOM; National Energy Technology Laboratory

3:50 PM
Synthesis of Ordered Mesoporous Nano Materials from Coal Fly Ash: A Novel CO2-assistant Precipitation Technology: Feng Yan; Jianguo Jiang; Zuotai Zhang; Tsinghua University; Southern University of Science and Technology

4:10 PM Break

4:30 PM Invited
In-operando Non-invasive Optical Visualization of Battery Reactions and Processes: Nian Li; Yutong Wu; Peng Chen; Georgia Institute of Technology

4:50 PM Invited
In Situ Interface Observation of Solution Growth of 4H-SiC at the Initial Growth Stage from Different Solvents: Takeshi Yoshitake; Yao Yuchuan; Takumi Horikite; Sakiko Kawanishi; The University of Tokyo; Tohoku University

5:10 PM
Advanced In Situ Electron Microscopy Characterization of Hydrogen and Helium Evolution in Materials: Caitlin Taylor; Joshua Sugar; David Robinson; Samuel Briggs; Warren York; Brittany Muntifering; Noelle Catarineu; Khalid Hattar; Sandia National Laboratories

MATERIALS PROCESSING

Advances in Surface Engineering — Session II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeep Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Monday PM | March 11, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, a GE Company

2:30 PM Invited
Structurally Integrated, Damage Tolerant Coatings: Sanjay Sampath; Gregory Smith; Stony Brook University

2:50 PM Invited
Influence of Stacking Fault Energy (SFE) and Post Heat Treatment on the Microstructure and Mechanical Properties of Cold Sprayed Aluminium Bronze Coatings: Sundararajan G.; Naveen Chavan; Prita Pant; Sudharshan Phani Pardhasaradhi; Indian Institute of Technology Madras; International Advanced Resch Center for Powder Metallurgy and New Materials; Indian Institute of Technology Bombay

3:10 PM
Computer Vision and Feature Selection Approach to Analyzing Rough Surfaces for Fatigue Crack Initiation: Christopher Kanzos; Anthony (Tony) Rollett; Carnegie Mellon University

3:30 PM
Application of Shot Peening on α+β and β Titanium Alloys to Form Nanocrystalline Layers: David Brice; David Bahr; Kevin Trumble; Purdue University

3:50 PM
Microstructural Simulation of Thermal Spray Coatings: Comparison with 3D Characterization: Theron Rodgers; Aaron Olson; Warren Davis; Andrew Vackel; Andrew Chuang; Rejeu Pokhare; Don Brown; Bjorn Clausen; Timothy Ickes; Nathan Moore; Sandia National Laboratories; Argonne National Laboratory; Los Alamos National Laboratory

4:10 PM Break

4:30 PM
Surface Characterization of the As-built Ti-6Al-4V Parts Produced using Electron Beam Melting Technology (EBM): Leila Ladani; Md. Jamal Mian; University of Texas at Arlington

4:50 PM
Nitrided Layers Investigated at the Atomic Scale by Atom Probe Tomography: Frederic Danoix; Raphaëlle Danoix; Andrius Martinavičius; Peter Jessner; Mohamed Gouné; CNRS - Universite De Normandie Rouen; CNRS ICMB

5:10 PM
Understanding the Effects of Lubricants/Coatings on Friction and Wear during Reciprocatory Sliding Motion at High Contact Pressures: Devika Mishra; Farjana Sonia; Dinesh Srivastava; G. Ganesh; Upal Singh; Amartya Mukhopadhyay; Indian Institute of Technology, Bombay; Nuclear Fuel Complex, Department of Atomic Energy

5:30 PM
Microstructure and Mechanical Properties of Directed Vapor Deposited Mg-Mn Alloy Coatings: Rakesh Kamath; Yuan Li; Youxiang Ye; Derek Hass; Hahn Choo; University of Tennessee, Knoxville; Directed Vapor Technologies International

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Atomistic, Mesoscale, and Machine Learning Algorithms for Study and Design of Materials


Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Sriliviputhur, University of North Texas

Monday PM | March 11, 2019
304A | Henry B. Gonzalez Convention Center

Session Chair: Srikanth Patala, North Carolina State University

2:30 PM Invited
Hybrid Atomistic-Continuum and Mesoscale-Continuum Approaches to Model the Microstructural Evolution during Laser Processing of Metallic Materials: Sergey Galitskly; Dmitry Ivanov; Avinash Dongare; University of Connecticut; University of Kassel
3:00 PM
A Diffusive Molecular Dynamics Method for the Simulation of Long-Term Mass Transport in Nanomaterials: Xingsheng Sun; Pilar Ariza; Michael Ortiz; Kevin Wang; Virginia Polytechnic Institute and State University; Universidad de Sevilla; California Institute of Technology

3:20 PM
Accelerated Quantum Molecular Dynamics for Chemical Reactions: Enrique Martinez Saez; Christian Negre; Romain Perriot; Marc Cawkwell; Danny Perez; Arthur Voter; Anders Niklasson; Los Alamos National Laboratory

3:40 PM
Scale-bridging from the Atoms Up: Employing Machine Learning to Improve the Accuracy and Scalability of Molecular Dynamics: Mitchell Wood; Mary Alice Cusentino; Aidan Thompson; Sandia National Laboratories

4:00 PM Break

4:30 PM
Designing High-strength Carbon-nanotube Polymer Composites Using Reinforcement Learning Algorithms Integrated with Molecular Dynamics Simulations: Aowabin Rahman; Matthew Radue; Gregory Odegard; Michael Czabaj; Ashley Spear; University of Utah; Michigan Technological University

4:50 PM
Extended Common Neighbor Analysis to Characterize the Nucleation and Growth Mechanism of Deformation Twins in Polycrystalline HCP Microstructures: Garvit Agarwal; Avinash Dangare; University of Connecticut

5:10 PM
Virtual Diffraction Analysis of Microstructural Features in Discrete Dislocation Dynamics Simulations: Darshan Banney; Laurent Capolungo; Douglas Spearot; University of Florida; Los Alamos National Laboratory

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen. National Tsing Hua University; Franck Gascoin, Ensciencia University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Monday PM | March 11, 2019
216B | Henry B. Gonzalez Convention Center

Session Chairs: Tiejun Zhu, Zhejiang University; Philippe Jund, Université de Montpellier

2:30 PM Invited
Realizing High Thermoelectric Performance in Cubic GeTe via Sb-Doping: A First-Principles Study: Benjamin Chang; Mei-Yin Chou; Academia Sinica

2:50 PM Invited
Influence of Defects on the Thermoelectric Properties of Materials: An Ab Initio Study: Alexandre Berche; Philippe Jund; Montpellier University

3:10 PM Invited
Entropy Engineering in Multi-principal-element Alloys SnTe: Jian He; Lipeng Hu; Clemson University; Shenzhen University

3:30 PM Invited
Electronic and Phononic Engineering for High Thermoelectric Performance: David Singh; University of Missouri

3:50 PM Invited
Doping Effects on the Electronic Structures and Transport Properties of GeS-Type IV-VI Crystals: Yue Chen; The University of Hong Kong

4:10 PM Break

4:30 PM Invited
New n-type half-Heusler Thermoelectric Materials: Chenguang Fu; Yintu Liu; Federico Serrano-Sánchez; Xinbing Zhao; Tiejun Zhu; Claudia Felser; Max Planck Institute for Chemical Physics of Solids; Zhejiang University

4:50 PM Invited
DFT Approach Toward Predicting TE Properties and Understanding their Relationships with the Charge Density Distribution: Pascal Boulet; Pingping Jiang; Hailong Yang; Marie-Christine Record; Aix-Marseille University

5:10 PM Invited
Silicides Thermoelectric Modules: Performances and Challenges: Mahdi Mejri; Benoit Malard; Yohann Thimont; Krunoslav Romanjek; Claude Estournès; CIRIMAT/UT3-Paul Sabatier; CIRIMAT/ENSICET; CEA-LITEN; CNRS/CIRIMAT

5:30 PM
The Scattering of Phonons by Edge Dislocations: Yandong Sun; Yanguang Zhou; Jian Han; Ming Hu; Ben Xu; Laboratory of Advanced Materials, School of Materials Science and Engineering, Tsinghua University; University of California Los Angeles; University of South Carolina

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Aluminum Alloy Development

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

Monday PM | March 11, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Dmitry Sediako, University of British Columbia - Okanagan

2:30 PM Introductory Comments

2:35 PM Invited
Clustering Behavior of Al-Mg-Si Alloys with Ag and Cu Addition during Natural and Artificial Aging: Zhihong Jia; Yaoyao Weng; Chongqing University

3:05 PM
Influence of Amine Additives on the Electrodeposition of Aluminum from AlCl3- Dimethyl Sulfone Electrolytes: SalahSalman; Sangjae Kim; Sang-Jae Kim; Kensuke Kuroda; Masazumi Okido; Al-Azhar University; Nagoya University

3:30 PM
Determination of the Intermetallic a-Phase Crystal Structure in Aluminum Alloys Solidified at Rapid Cooling Rates: Joseph Jankowski; Michael Kaufman; Amy Clarke; Krish Krishnamurthy; Paul Wilson; Colorado School of Mines; Honeywell; Boeing
3:55 PM  
Comparison of the Effects of B4C and SiC Reinforcement in Al-Si Matrix Alloys Produced via PM Method: Yavuz Kaplan², Engin Tan³, Hakan Ada²; Sinan Aksöz¹; ¹Pamukkale University; ²Kastamonu University

4:20 PM  Break

4:35 PM  
The Effects Manganese (Mn) Addition and Laser Parameters on the Microstructure and Surface Properties of Laser Deposited Aluminum Based Coatings: Olawale Fatoba¹, Stephen Akintabi¹, Esther Akintabi¹; ¹University of Johannesburg

5:00 PM  
Understanding the Role of Cu and Clustering on Stratification and Strain Rate Sensitivity of Al-Mg-Si-Cu Alloys: Michael Langille¹; Bradley Diak²; Frederic De Geuser²; Gilles Guigliondah²; Sami Meddeb²; Huan Zhao²; Baptiste Gault²; Dierk Raabe², Alexis Deschamps²; ²Genoble Institute of Technology; ³Queen’s University; ¹Constitelium CTEC; ²MPIE, Dusseldorf

5:25 PM  
Production of the AA2196-TIB2 MMCs via PM Technology: Engin Tan³, Yavuz Kaplan², Hakan Ada²; Sinan Aksöz¹; ¹Pamukkale University; ²Kastamonu University

5:50 PM  
Retrogression-reaging Behavior in Aluminum AA6013-T6 Sheet: Katherine Rader¹; Jon Carter¹; Louis Hector¹; Eric Taleff¹; ¹University of Texas Austin; ²General Motors

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MONDAY PM

LIGHT METALS

Aluminum Reduction Technology — Cell Technology Development and Modeling

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Marc Dupuis, GeniSim Inc

Monday PM | March 11, 2019
004 | Henry B. Gonzalez Convention Center

Session Chair: Steeve Renaudier, Rio Tinto

2:30 PM  Introductory Comments

2:35 PM  
How to Limit the Heat Loss of Anode Stubs and Cathode Collector Bars in Order to Reduce Cell Energy Consumption: Marc Dupuis¹; ¹GeniSim Inc

3:00 PM  
Transformation of a Potline from Conventional to a Full Flexible Production Unit: Roman Düssel¹; Albert Mulder¹; Louis Bugnion¹; ¹TRIMET Aluminium SE; ²KAN-NAK SA

3:25 PM  
Modernisation of Sumitomo S170 cells at Boyne Smelters Limited: Chris Corby¹; Hao Zhang¹; Madeleine Lewis¹; James Roberts¹; ¹Boyne Smelters; ²Pacific Aluminium

3:50 PM  
Environmental Aspects of UC RUSAL’s Aluminum Smelters Sustainable Development: Viktor Buzunov¹; Viktor Mann²; Vitaliy Pingin²; Aleksey Zherdev²; Vyacheslav Grigoriev³; ¹RUSAL ETC; ²UC RUSAL; ³Rusal Etc; ²RUSAL SibVAMI

4:15 PM  Break

4:30 PM  
Copper Insert Collector Bar for Energy Reduction in 360 kA Smelter: Amit Jha¹; Amit Gupta¹; Vinay Tiwari¹; Shashidhar Ghatnati²; Kamal Pandey²; S.K. Anand³; ³Aditya Birla Science and Technology Company Pvt Ltd; ²Hindalco Industries Ltd, Mahan Aluminium

4:55 PM  
New Resource-saving Technologies for Lining the Cathode with Un-shaped Lining Materials: Alektsandr Proshkin¹; Vitaliy Pingin²; Victor Mann³; Yuri Shtefanyuk³; Anton Orlov³; ³RUSAL

5:20 PM  
Amperage Increase from 195kA to 240kA through Pot Upgrading: Liu Ming¹; Yang Xiaodong¹; Liu Yafeng¹; Lu Yanfeng¹; ¹SAMI

5:45 PM  Concluding Comments

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — Semiconductors and Light-weight Alloys

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Monday PM | March 11, 2019
303A | Henry B. Gonzalez Convention Center

Session Chairs: Gang Sha, Nanjing University of Science and Technology; Keith Knipling, Naval Research Laboratory

2:30 PM  Invited  
The Role of Atom Probe Tomography in Revealing the Semiconductor Physics of Nitride Alloys, Heterostructures and Devices: James Speck¹; ¹Materials Department

3:05 PM  
Atomic-scale Chemical Analysis of Grain Boundaries and Surfaces of Nb3Sn Coatings on Nb for Superconducting Radiofrequency Cavity Applications Using Atom Probe Tomography and High-resolution Scanning Transmission Electron Microscopy: Jaeyel Lee¹; Sam Posen¹; Kai He¹; Zugang Mao¹; Zu Hawn Sung²; Yulia Trenikhina²; Sung-II Baik¹; David Seidman¹; ²Northwestern University; ³Fermi National Accelerator Laboratory

3:25 PM  Invited  
Characterization of a Si FinFET Structure and Dopants Distributions by Atom Probe Tomography: Rong Hu¹; Jing Xue¹; Xingping Wu¹; Yanbo Zhang¹; Huilong Zhu¹; Gang Sha¹; ³Nanjing University of Science and Technology; ²Institute of Microelectronics of Chinese Academy of Sciences
4:00 PM Break

4:20 PM Invited
Mechanisms of Beta-to-omega and Omega-assisted Alpha Phase Formation in Near Beta-titanium Alloys: Tong Li1; Damon Kent1; Gang Sha2; Anna Ceguerra3; Matthew Dargusch4; Julie Cairney4; 1Ruhr-Universität Bochum; 2University of the Sunshine Coast; 3Nanjing University of Science and Technology; 4University of Sydney; 5The University of Queensland

4:55 PM
Processing-microstructure-property Relationships of Fe and Al Modified Ti-Cr Alloys: Joonh Bailor1; Vahid Khademi1; Harish Chakravarty2; Masahiko Ikeda3; Jane Howe4; Takeshi Sunaoshi5; Arun Devaraj6; Carl Boehlert7; 1Michigan State University; 2Kansai University; 3Hitachi; 4Pacific Northwest National Laboratory

5:15 PM
Chemistry Stoichiometry of Titanium Carbide Crystals Grown in Different Metal Melts during Combustion Synthesis Revealed by Atom Probe Tomography: Shenhao Jin1; Haokai Su2; Gang Sha3; 1Nanjing University of Science and Technology

5:35 PM
Dynamic Precipitation of a 7075 Al Alloy under High-pressure Torsion Processing: Y Zhang1; S Jin1; X Liao2; M Murashkin3; R Valiev4; Gang Sha5; 1Nanjing University of Science And Techno; 2The University of Sydney; 3Ufa State Aviation Technical University

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Monday PM | March 11, 2019
217C | Henry B. Gonzalez Convention Center

Session Chair: Hendrik Heinz, University of Colorado

2:30 PM Keynote
The Impact of Structural Factors and Solvent Effects on Macromolecular Self-assembly at Interfaces: Jim Deyoreo1; 1Pacific Northwest National Laboratory; University of Washington

3:10 PM
Peptide Adsorption on Hydroxyapatite Surfaces and Implications on Shape and Mineralization: Impact of Sequence and Electrolyte pH: Juan Liu1; Samuel Hoff2; Sarah VanOosten3; Chandrani Pramanik4; Tariq Jamil5; Kyle Boone6; Candan Tamerler7; Hendrik Heinz8; 1University of Colorado Boulder; 2The University of Kansas

3:30 PM Keynote
Molecular Biomimetics: Engineered-peptide Guided Technology and Medicine: Mehmet Sarıkaya1; 1University of Washington

4:10 PM Break

4:30 PM Invited
Bioelectronics Interface by Self-assembled Peptides on Two-dimensional Materials: Yuhei Hayamizu1; 1Tokyo Institute of Technology

BIOMATERIALS

Biological Materials Science — Biological and Natural Materials II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Rajendra Kasinath, DePuy Synthes U(Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Monday PM | March 11, 2019
217A | Henry B. Gonzalez Convention Center

Session Chairs: Jing Du, Penn State University; Vinoy Thomas, University of Alabama

2:30 PM Invited
Contributions of Intermolecular Bonding to the Strain Rate Response of Fish Scales: Sean Ghods1; Emily Weller2; Sarah Waddell3; Hanyan Jiang4; E. Alex Ossa5; Dwanye Arola6; 1Univ of Washington; 2Southeast University; 3Universidad EAFIT

3:00 PM
A Structural Characterization of the Mechanical Properties of Porcine Skin: Andrei Pissarenko1; Wen Yang1; Haocheng Quan2; Katherine Brown1; Alun Williams2; William Proud3; Marc Meyers4; 1University of California San Diego; 2Imperial College London; 3University of Cambridge

3:20 PM
Cuticle of the Armadillidium Vulgare: Microstructure and Mechanical Behavior: Nana Yamagata1; Arthur Beausoleil2; Kate Erickson1; Mitchell Nakaki2; Junlan Wang1; Dwanye Arola1; 1University of Washington

3:40 PM
On the Three-dimensional Structure and Mechanical Behavior of the Highly Porous Structure of Sea Urchin Spines: Ling Li1; Ting Yang2; Ziling Wu3; Yunhui Zhu4; 1Virginia Polytechnic Institute

4:00 PM
Further Insights on the Damage Tolerance of the Crossed-lamellar Structure of Mollusk Shells: Zhifei Deng1; Ling Li2; 1Virginia Tech, Department of Mechanical Engineering

4:20 PM Break

4:40 PM Invited
Effect of Orientation on Water-repellant Legs of Water-walking Insects: Georgia Hurchalla1; Jaroslav Drellich1; 1Michigan Technological University

5:10 PM
Revealing the Self-sharpening Mechanisms of Sea Urchin Teeth: In Situ Testing and Modeling: David Restrepo1; Matthew Daly2; Alireza Zaheri3; Horacio Espinosa4; 1The University of Texas at San Antonio; 2University of Illinois at Chicago; 3Northwestern University

5:30 PM
Shear Mechanics of the Boxfish Hexagonal Scutes: Maryam Hosseini1; Sean Garner2; Steven Naleway3; Joanna Mckittrick4; Pablo Zavattieri1; 1Purdue University; 2University of California San Diego; 3University of Utah

5:50 PM
The Fracture Toughness of Arapaima Giga Scales: Haocheng Quan1; Wen Yang1; Sheng Yin2; Robert Ritchie3; Marc Meyers4; 1University of California San Diego; 2University of California Berkeley

5:50 PM
LIGHT METALS

Cast Shop Technology — EHS and Cast House Operation

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Monday PM | March 11, 2019
007B | Henry B. Gonzalez Convention Center

Session Chair: Arild Hakonsen, Hycast

2:30 PM Introductory Comments

2:35 PM
No Personnel in Hazard Zones: Arild Hakonsen1; 1Hycast As

3:00 PM
The Industrial Application of Molten Metal Analysis (LIBS): Caitlin Detwiler1; James Herbert1; Jorge Fernandez1; Joseph Craparo2; Robert DeSaro1; 1Altek Llc; 2Energy Research Company (ERCo)

3:25 PM
Sheet Ingot Casting Improvements at TRIMET Essen: Nicholas Towsey1; Andreas Luetzerath1; Georg Scheele1; Elmar Schoell1; 1TRIMET Aluminium AG

3:50 PM Break

4:05 PM
Automated Billet Surface Inspection: Jean-Pierre Gagne1; Rémi St-Pierre1; Pascal Coté1; Francis Caron1; 1Stas Inc; 2ALCOA

4:30 PM
Optical Emission Spectrometry (OES) Data-driven Inspection of Inclusions in Wrought Aluminium Alloys: Varuzan Kevorkijan1; Tomaž Šustar1; Irena Lesjak1; Marko Degiampietro1; Janez Langus1; 1Impol R in R d.o.o.; 2C3M

4:55 PM
Hydrogen Measurements Comparaison in EN-AW 5083 Alloy: Luisa Marzoli1; Federica Pascucci1; Giuseppe Esposito1; Silvia Koch1; Giulio Timelli1; Marcel Rosefort1; 1Trimet Aluminium SE; 2DTG Università di Padova

5:20 PM
Refurbishment of a Rail-guided Casting Pit: A Case Study with Sierra Aluminium: Jean Francois Desmeules1; Shaun Hamer1; Shayne Seever1; 1Dynamic Concept; 2AluMore; 3Sierra Aluminium

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Fabrication and Characterization

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Monday PM | March 11, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Lingfeng He, Idaho National Laboratory; Michael Tonks, University of Florida

2:30 PM Invited
Mechanistic Mesoscale Simulation of UO2 Sintering: Ian Greenquist1; Michael Tonks2; Yongfeng Zhang3; 1Pennsylvania State University; 2University Of Florida; 3Idaho National Laboratory

3:00 PM
Role of Grain Orientation and Grain Boundary Inclination during Sintering of UO2: A Phase-field Study: Sudipta Biswas1; Daniel Schwen1; Vikas Tomar2; 1Idaho National Laboratory; 2Purdue University

3:20 PM
Assessment of UO2 Based Composites Fabricated via SPS: Erofili Kardoulaki1; Ursula Carvajal Nunez1; Andy Nelson1; Darrin Byler1; Bowen Gong1; Tiankai Yao2; Jie Lian3; Ken McClellan4; 1Los Alamos National Lab; 2Rensselaer Polytechnic Institute

3:40 PM Invited
Mesoscale Modeling of Grain Growth in Ceramics: Karim Ahmed1; 1Texas A&M University

4:10 PM Break

4:30 PM
Microstructural Characterization of Transmutation Nitride Fuels for Fast Reactors: Lingfeng He1; Jason Harp1; 1Idaho National Laboratory

4:50 PM Invited
The Role of Dopant Charge State on Defect Chemistry and Grain Growth of Doped UO2: Michael Cooper1; Chris Stanek2; David Andersson3; 1Los Alamos National Laboratory

5:20 PM
Characterization of Intragranular Creep Deformation in Uranium Dioxide: A Multicrystal Approach: Benjamin Shaffer1; Pedro Peralta2; 1Arizona State University
CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Characterization Method Development II

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CemnetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday PM | March 11, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Rajiv Soman, EAG Laboratories; Bowen Li, Michigan Technological University

2:30 PM Introductory Comments

2:35 PM Invited
Correlating Structure, Processing, and Properties of Disordered Materials for Electronic and Photovoltaic Applications: Gabriel Calderon1; Jared Johnson1; Menglin Zhu2; Mehrdad Abbasi2; Michelle Paquette2; Paul Rulis3; Nathan Oyler3; Ridwan Sakidja3; Jinwoo Hwang1;2; Hong Kong University of Science and Technology; University of Wisconsin - Milwaukee; University of Missouri - Kansas City; Missouri State University

2:55 PM Invited
Total Scattering and Reverse Monte Carlo for the Analysis of Local Effects in Alloys: Lewis Owen1; Helen Playford1; Matthew Tucker1; Howard Stone1; University of Cambridge; ISIS Neutron and Muon Source; Oak Ridge National Laboratory

3:15 PM
An Application of Computer Vision for Exploring Processing-structure-property Relationships in a Scalable Materials Database Framework: Andrew Kitahara1; Elizabeth Holm1; Carnegie Mellon University

3:35 PM
New HEDM Developments and Applications to In-situ Annealing Measurements: He Lu1; Robert Suter1; Yufeng Shen1; Carnegie Mellon University

3:55 PM
Structural Characterization of Four Chinese Bituminous Coals by X-ray Diffraction, Fourier-transform Infrared Spectroscopy and X-ray Photoelectron Spectroscopy: Shuxing Qiu1; Mengting Zhang2; Xiaohu Zhou1; Rongjin Zhu1; Guibao Qiu1; Yue Wu1; Guangsheng Suo1; Chongqing University

4:15 PM Break

4:30 PM Invited
Mapping Grain Morphology and Orientation by Laboratory Diffraction Contrast Tomography: Nicolas Gueninchault1; Florian Bachmann1; Hrishikesh Bale2; Jun Sun1; William Harris1; Steve Kelly1; Christian Holzner1; Erik Lauridsen3; Xnovo Technology Aps; Carl Zeiss Microscopy

4:50 PM Invited
In Situ Characterization at High Temperature of VDM Alloy 780 Premium to Determine Solvus Temperatures and Phase Transformations Using Neutron Diffraction and Small-angle Neutron Scattering: Cecilia Solis1; Johannes Munke1; Michael Hofmann1; Sebastian Mühlbauer1; Martin Berger2; Bodo Gehrmann1; Joachim Rössler1; Ralph Gilles1; Heinz Maier-Leibnitz Zentrum (MLZ) TU München; 1Institut für Werkstoffe, Technische Universität Braunschweig; 2VD Metals International GmbH

5:10 PM Invited
Computational Database to Facilitate Discovery of 3D and 2D Materials with Technological Applications: Kamal Choudhary1; Francesca Tavazza1; University Of Maryland (National Institute of Standards and Technology)

5:30 PM
Study of the Adsorption of Humic Acid with Zn2+ by Molecular Dynamic Simulation and Adsorption Experiments: Shengpeng Su1; Yanfang Huang1; Guihong Han1; Zibiao Guo1; Fengning Liu1; Zhengzhou University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Construction Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CemnetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday PM | March 11, 2019
006A | Henry B. Gonzalez Convention Center

Session Chair: Jeongguk Kim, Korea Railroad Research Institute

2:30 PM Introductory Comments

2:35 PM Invited
Microstructure Characterization of Portland Cement-based Pastes Exposed to an Organic Acid Solution: Rancés Castillo Lara2; Universidade Estadual do Norte Fluminense Darcy Ribeiro

2:55 PM
Use of Municipal Solid Waste Incinerator (MSWI) Fly Ash in Alkali Activated Slag Cement: Huang Kang1; Fan Xiaohui1; Gan Min1; Ji Zhiyuan1; Central South University

3:15 PM
Charpy Impact Tests Analysis on Polymer Composites, Epox Reinforced with (Palf) Fibers: Maycon Gomes1; Sergio Monteiro1; Antonio Munhoz Junior2; Maria das Graças Silva-Valenzuela3; Francisco Valenzuela3; Escola Politecnica Da U De Sao Paulo; 1Universidade Presbiteriana Mackenzie
CORROSION

Coatings and Surface Engineering for Environmental Protection — Corrosion Mechanism and Performance Evaluation II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Monday PM | March 11, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Michael Mayo, PPG Industries; Rajeev Gupta, The University of Akron

2:30 PM Invited
New Accelerated Corrosion Test Methods for Atmospheric Corrosion on Aluminum Aircraft: Ekaterina Badaeva; Nels Olson; James Kirchner; Maribel Locsin; Kyle Clayton; Jill Seebergh; Boeing Company

3:10 PM
Investigating the Electrical Resistance (ER) Technique for In-situ Structural Alloy Corrosion Monitoring within Supercritical CO2 Power Cycles: Matthew Walker; Sandia National Laboratories

3:30 PM
Seawater Corrosion Results for 11 Alloys Tested at the TAMUG Boat Basin Site: Richard Griffin

3:50 PM
Characterizing High-temperature Asphaltnie Fouling and Corrosion of Ferrous Alloys: Pralav Shetty; Velu Subramani; Paul Braun; Jessica Krogstad; University of Illinois at Urbana-Champaign; BP Products North America Inc.

4:10 PM Break

4:30 PM
Corrosion Test Methods for New Materials and Mixed Material Assemblies: Brian Okerberg; Laurent Deronne; PPG Industries

4:50 PM
Effect of Aluminizing on Cyclic Oxidation Behavior of 304H Stainless Steel at 650oC in Dry/Wet Air: Fu Pen Cheng; Wu Ka; Ji-Jungh Kai; National Taiwan Ocean University; Institute of Materials Engineering, National Taiwan Ocean University, Keelung, Taiwan; Department of Mechanical and Biomedical Engineering, The City University of Hong Kong, Kowloon, Hong Kong

5:10 PM
Investigation of Self-healing Properties of Cerium-based Conversion Coatings on Mg Alloys: Brent Williams; Lamia Nahari; Diana Galeano-Osorio; Carlos Castano Llondona; Virginia Commonwealth University; Universidad Nacional Abierta y a Distancia

MATERIALS DESIGN

Computational Materials Discovery and Design — Applications for Defects and the Bulk I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ming Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

Monday PM | March 11, 2019
304C | Henry B. Gonzalez Convention Center

Session Chairs: Prineha Narang, Harvard University; Ning Zhang, Colorado School of Mines

2:30 PM Invited
Modeling Microstructural Evolution under Applied Magnetic Fields: Heather Murdoch; Philip Goins; Efrain Hernandez; US Army Research Laboratory

2:50 PM
Phase-field Modeling of Stacked Dislocation Pile-ups in Face-centered Cubic Metals: Shouzhi Xu; Abigail Hunter; Irene Beyerlein; University of California, Santa Barbara; Los Alamos National Laboratory

3:10 PM
Elastic Properties of Bulk and Low-dimensional Materials Using DFT with Van Der Waals Functional: Kamal Choudhary; Gowoon Cheon; Evan Reed; Francesca Tavazza; National Institute of Standard and Technology; Stanford University

3:30 PM
Correlate the Local Structural Characteristics with the Activation Energy of CuZr Metallic Glasses by Using Activation-relaxation Technique and Machine Learning Methods: Liang Tian; Lin Li; University of Alabama

3:50 PM Break

4:10 PM
Learning to Twin: A Novel Application of Machine Learning to the Prediction of Twinning in Materials: William Schill; Dingyi Sun; California Institute of Technology; Brown University

4:30 PM
Simulations and Experiments of Template-directed Eutectic Solidification to Design Self-organizing Optical Metamaterials: Erik Hanson; Ashish Kulkmari; Julia Kohaneck; Paul Braun; Katsuyo Thornton; University of Michigan; University of Illinois

4:50 PM
The Effects of β-stabilizers on α-phase Formation and Elastic Properties in Titanium Alloys: Riyadh Salloom; Srinivasan Srilvilliputhur; University of North Texas

5:10 PM
Tuning Martensitic Behavior Using Free Energy Landscape Engineering: Saiketh Desai; Sam Reeve; Karthik Vishnu; Alejandro Strachan; Purdue University
**PHYSICAL METALLURGY**

Computational Thermodynamics and Kinetics — Novel Approaches

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

**Monday PM | March 11, 2019
225C | Henry B. Gonzalez Convention Center**

**Session Chairs:** James Morris, Oak Ridge National Laboratory; Yu Zhong, Worcester Polytechnic Institute

2:30 PM Invited
Introducting a Novel Concept of High Entropy Ceramic (HEC) by Using Computational Thermodynamics: Yu Zhong1; Hooman Sabarou2; Xiaotian Yan3; Mei Yang2; Richard Sisson1; 1Worcester Polytechnic Institute

3:00 PM
Adiabatic Electron-Phonon Interactions in Vanadium and FeTi: Fred Yang1; Olle Hellman1; Jorge Muñoz2; Brent Fultz1; 1California Institute of Technology; 2The University of Texas at El Paso

3:20 PM
Computational and Experimental Studies of Anharmonic Phonons in Cuprite: Claire Saunders1; Dennis Kim2; Olle Hellman1; Hillary Smith1; Doug Abernathy1; Brent Fultz1; 1California Institute of Technology; 2University of California, Los Angeles; 3Oak Ridge National Laboratory

3:40 PM
Universal Correlation between d-band Bimodality and Solute-defect Interactions in bcc Refractory Metals: Yong-Jie Hu1; Ge Zhao2; Chaoming Yang1; Xiaofeng Qian1; Liang Qi; 1The Pennsylvania State University; 2Texas A&M University

4:00 PM
Kinetic Monte Carlo Simulations of Structural Evolution of Additively Manufactured Materials: Xiaowang Zhou1; Nancy Yang1; Joshua Keng Yee2; Jose Juan Chavez2; 1Sandia National Laboratories

4:20 PM Break

4:40 PM Invited
Thermotransport and Thermodynamics in Ternary Liquid Alloys: Graeme Murch1; Irina Belova1; Tanvir Ahmed2; Zi-Kui Liu3; William Yi Wang1; Andreas Meyer1; 1University of Newcastle; 2The Pennsylvania State University; 3Northwestern Polytechnical University; 4Institute of Materials Physics in Space

5:10 PM
DFT Study of C Diffusion in WC/W Interfaces Observed in WC/1

5:30 PM
Atomic-level Insight into Oxygen Adsorption on (hkl) Platinum Surfaces and Implications for the Reactivity in the Oxygen Reduction Reaction: Shiyi Wang1; Enbo Zhu2; Yu Huang2; Hendrik Heinz2; 1Department of Biological and Chemical Engineering, University of Colorado Boulder; 2University of California, Los Angeles; 3University of Colorado Boulder

5:50 PM
Interplay between Magnetism and Defects Properties in bcc Fe-Mn Alloys: From First Principles to Finite Temperatures: Anton Schneider1; Chu-Chun Fu2; Frederic Soisson3; Cyrille Barreteau2; 1Service de Recherches de Metallurgie Physique, CEA, Paris-Saclay University, France; 2Service de Physique de l’Etat Condensed, CEA-CNRS, Université Paris-Saclay

**MECHANICS & STRUCTURAL RELIABILITY**

Deformation and Damage Behavior of High Temperature Alloys — Refractories, Intermetallics, and Mesoscopic Modeling

**Sponsored by:** TMS Structural Materials Division; TMS: High Temperature Alloys Committee

**Program Organizers:** Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detroit, National Energy Technology Laboratory

**Monday PM | March 11, 2019
301C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Akane Suzuki, GE Global Research; Jonathan Cormier, Institute P3 - Departement de Physique et Mecanique des Matieraux

2:30 PM Invited
Creep Behavior of Intermetallic Mo-silicide Alloys: Martin Heilmair1; Alexander Kauffmann2; Camelia Gombola1; Susanne Obert1; 1KIT Karlsruhe

3:00 PM Invited
Recent Progresses on Lightweight High Temperature TiAl Intermetallic Alloys and Related Processing: Junpin Lin1; Yongfeng Liang1; Laiqi Zhang1; Jianping He1; 1University of Science and Technology Beijing

3:30 PM
Sliding Wear of Nanocrystalline Nb-Ag at Elevated Temperatures: Evolution of Subsurface Microstructure and Its Correlation with Wear Performance: Ren Fuzeng1; Kangjie Chu1; 1Southern University of Science and Technology

3:50 PM
High Temperature Creep of Alloy 709: Effect of Aging: Martin Taylor1; Nicholas Schaber1; Jose Ramirez2; Anumat Sithitho3; Indrajit Chari4; Gabriel Potirniche4; Robert Stephens1; Michael Glazoff4; 1University of Idaho; 2Idaho National Laboratory

4:10 PM Break

4:30 PM Models of Long-Term Creep Behavior of High Performance Structural Alloys: Changning Niu1; Abhinav Saboo1; Qiaofu Zhang1; Jiadong Gong1; Jifeng Zhao1; David Dunand2; Gregory Olson1; 1QueStek Innovations, LLC; 2Northwestern University

4:50 PM Benchmarking Multi-scale Models with Microtensile Experiments and 3D Microstructural Characterization of René 88DT: David Eastman1; Paul Shade2; Michael Uchic3; George Weber2; Akbar Bagri1; Somnath Ghosh1; Will Lenth3; Tresa Pollock4; Kevin Hemker5; 1Johns Hopkins University; 2U.S. Air Force Research Laboratory; 3University of California, Santa Barbara
5:10 PM  
Effect of Local Texture on Heterogeneous Plastic Strain Fields during High-Temperature Creep in Ni-based superalloys using Crystal Plasticity Finite Element Simulations: Jean-Briac le Graverend1; 1Texas A&M University

5:30 PM  
Deformation Behavior and Constitutive Models for High Temperature Isothermal Compression of a Newly Type of Ni3Al-based Superalloy: Jiangwei Zhong1, Qingsyan Xu2; 2Tsinghua University

SPECIAL TOPICS

Diversity in STEM and Best Practices to Improve it — Being Out in STEM

Program Organizers: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica Krogstad, University of Illinois at Urbana-Champaign; Panthea Sepehrband, Santa Clara University

Monday PM | March 11, 2019
301B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica Krogstad, University of Illinois at Urbana-Champaign; Panthea Sepehrband, Santa Clara University

2:30 PM  
The Minority Leaders Research Collaboration Program at the Air Force Research Laboratory Materials and Manufacturing Directorate: Overview, Experiences, and Lessons Learned: Ashley Blackford1; Eric Payton2; 1U.S. Air Force Research Laboratory

2:00 PM  
TMS Summits on Diversity: What Have We Learned and Where Do We Go From Here?: Jonathan Madison1, Jennifer Andrew2, Megan Brewster3, Amy Clarke4, Kristen Constant5, Oscar Dubon6, Emily Kinser7, Matthew Korey8, Natalie Larson9; Xavier Ochoa10, Michael Rawlings11; Rosa Maria Rojas12; Sandia National Laboratories; 1University of Florida; 2Launch Forth; 3Colorado School of Mines; 4Iowa State University; 5University of California, Berkeley; 63M; 7Purdue University; 8University of California, Santa Barbara; 9McEwen Mining; 10AAAS Fellow, NSF; 11University of Arizona

2:30 PM  
The Complexity of Being LGBTQ+ In the Workplace: Roberta Beatle1; 1Los Alamos National Laboratory

4:00 PM  
Break

4:30 PM  
The Time: How to Welcome and Support People of All Genders: K. Cunningham1; 1ATI Specialty Alloys & Components

5:00 PM  
Coming Out in STEM: Thomas Reeve1; 1Purdue University

LIGHT METALS

Electrode Technology for Aluminum Production — Electrodes - Raw Materials and Paste Plant

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Monday PM | March 11, 2019
006D | Henry B. Gonzalez Convention Center

Session Chairs: Stefan Vucic, Maschinenfabrik Gustav Eirich GmbH & Co; William Bishop, Oxbow Calciners; Ronald Logan, Sunstone Development

2:30 PM  
Introductory Comments

2:35 PM  
Changing the Fineness of Calcined Petroleum Coke with Ball Race Mills: Jens-Peter Thiel1, Jan Paepcke2, Arne Hilck3; 1Claudius Peters Projects GmbH

3:00 PM  
How to Appreciate the Coal Tar Pitch Impregnation on Coke Material?: Salima Belbachir1; Christophe Bouchet2, Fabien Gauldiere3; Pierre-Louis Perrin4, Quentin Bernabé4, Laurent Vonna5, Roger Gadiou6, Fabienne Virieux7; 1Fives Solios; 2Université de Haute Alsace

3:25 PM  

3:50 PM  
Challenges and Opportunities of Vacuum Compaction: Lessons Learnt from Retrofitting EGA-JA Paste Plant to Vacuum Compaction: Bienvenu Ndjom1, Mohammad Shafiq Malik2, Ahmed Al Marzouqi3, Tapan Kumar Sahu4, Saleh Ahmed Rabba5, Najeeba Al Jabi6; 1Emirates Global Aluminium

4:15 PM  
Break

4:30 PM  
Carbon Block Tracking Package based on Vision Technology: Pierre Mailieu1, Xavier Genin2, Christophe Bouchet2, David Brismalein3, Hervé Pedrolò4, Fabienne Virieux5; 1Fives Solios; 2Rio Tinto

4:55 PM  
Physical and Chemical Characterization of Bio-pitch as a Potential Binder for Anode: Ying Lu1, Roozbeh Mollaabbasi2, Donald Picard3, Donald Ziegler4, Houshang Alamdar5, 1Univérsité Laval; 2Alcoa Corporation

5:45 PM  
Anode Quality Monitoring using Advanced Data Analytics: Vincent Bonnivard1, Bilal Azennoud2, Ameline Bernard3, Hervé Pedrolò4, 1PROBAYES, 2Rio Tinto

5:45 PM  
Reactivity of Coke in Relation to Sulfur Level and Microstructure: Gerit Jorahsengen1; Stein Rervik2; Anne Petter Ratvik2, Lorentz Petter Lossius3, Richard Haverkamp4, Ann Mari Svensson5; 1NTNU - Department of Material Science and Engineering; 2SINTEF Industry; 3Hydro Aluminium AS, Primary Metal Technology; 4Massey University - School of Engineering and Advanced Technology
MATERIALS PROCESSING

Freeze Linings: Myth and Reality — Freeze Lining II

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Juergen Schmidl, RHI Magnesita; Dean Gregurek, RHI Magnesita; Gerardo Alvear, Glencore Technology; Peter Hayes, University of Queensland; Mark Kennedy, Proval. Partners SA; Maurits Van Camp, Umicore; Camilo Perez, RHI US Ltd; Stefan Luidold, University Of Leoben

Monday PM | March 11, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Dean Gregurek, RHI Magnesita

2:30 PM
Practical Knowledge on Refractory Freeze Linings Collected from Post Mortem Studies: Dean Gregurek1; Juergen Schmidl1; Alfred Spanring1; 1RHI Magnesita

2:50 PM
Use of Finite Element Analysis or Computation Fluid Dynamics for Estimation of Freeze Lining: Allan MacRae1; 1MacRae Technologies, Inc.

3:10 PM
High Temperature Corrosion of Magnesia based Refractory by Ferronickel Slags: Christoph Sagadin1; Stefan Luidold1; Christoph Wagner1; Christoph Richtler1; Alfred Spanning1; 1Montanuniversitaet Cdt-Tm; 1RHI Magnesita

3:30 PM
Freeze-lining Formation in Submerged Arc Furnaces Producing Ferrochre Alloy in South Africa: Joalet Steenkamp1; Quinn Reynolds1; Markus Erwee1; Stefan Swanepoel1; 1MINTEK

3:50 PM Break

4:10 PM
Designing Furnace Lining/Cooling Systems to Operate with a Competent Freeze Lining: Hugo Joubert1; Isobel McDougall1; 1Tenova Pyromet

4:30 PM
Thermochemistry Analysis of Slag Freeze Lining and Refractory Interaction with Slag to Support Furnace Integrity: Evgueni Jak1; Denis Shishin1; Taufiq Hidayat1; Maksym Shevchenko1; Peter Hayes1; 1University of Queensland

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Environmental Resistance and Processing

Sponsored by: TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

Monday PM | March 11, 2019
206A | Henry B. Gonzalez Convention Center

Session Chairs: Michael Titus, Purdue University; Katelun Wertz, Air Force Research Laboratory

2:30 PM Invited
Elucidating the Effects of Cr on the Microstructure, Oxidation Resistance and Mechanical Properties of Cobalt-based Superalloys: Ding-Wen Chung1; Jacques Perrin Toinin2; Daniel Ng2; Eric Lass3; David Seidman4; 1Northwestern University; 2National Institute of Standards and Technology

3:00 PM Invited
An ICME-base Investigation of the Homogenization of a Novel VIM/VAR Co-Ni Superalloy: Stephane Forsili1; Alberto Polar Rosas1; Ning Zhou1; Gian Colombo1; Tao Wang1; Richard Smith1; Akash Patel1; Samuel Kernion; Mario Epler1; 1Carpenter Technology Corporation

3:30 PM
Exploration of Thermo-Mechanical Processing Parameters for a Polycrystalline y-y’ Cobalt-base Alloy: Katelun Wertz1; Donald Weaver1; Eric Payton1; Lee Semiatin1; Michael Mills2; Stephen Niezgoda3; 1U.S. Air Force Research Laboratory; 2Ohio State University

3:50 PM Break

4:10 PM
The Formation of Protective Alumina on ‘Strengthened Co-Ni-Al-Mo-Ta Alloys during Exposure at Elevated Temperatures: Saurabh Das1; Mahander Singh1; Om Gosain1; Kamanio Chattopadhyay1; 1Indian Institute of Science

4:30 PM
Effect of Pre-deformation on the Aging Response of Co/Ni-base Superalloys: Christopher Zenk1; Connor Stone1; Katelun Wertz2; Michael Mills3; 1Ohio State University; 2U.S. Air Force Research Laboratory

4:50 PM
Thermophysical and Mechanical Properties of Multi-nary Single Crystalline Co-base Superalloys: Nichlas Volz1; Steffen Neumeier1; Mathias Göken1; 1Lehrstuhl für Allgemeine Werkstoffeigenschaften
ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Natural Fiber Composites

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Monday PM | March 11, 2019
008A | Henry B. Gonzalez Convention Center

Session Chairs: Lucio Nascimento, Instituto Militar de Engenharia; Fabio Garcia, Military Institute of Engineering

2:30 PM Introductory Comments

2:35 PM Keynote
Natural Fibers Reinforced Polymer Composites Applied in Ballistic Multilayered Armor for Personal Protection - An Overview: Sergio Monteiro; Jaroslav Drelich; 1Military Institute of Engineering; 2Michigan Technological University

3:15 PM
Structure-property Relation of Epoxy Resin with Fique Fibers: Dynamic Behavior using Split-hopkinson Pressure Bar and Charpy Tests: Julian Ruas; Sergio Neves Monteiro; Henry Colorado; 1Universidad De Antioquia; 2Military Institute of Engineering

3:35 PM
Comparison of the Impact Properties of Composites Reinforced by Natural Fibers: Felipe Perisse Duarte Lopes; Carlos Fontes Vieira; 1State University of Northern Rio de Janeiro UENF; 2State University of Northern Rio de Janeiro

3:55 PM Break

4:05 PM
Impact Energy Evaluation of Natural Castor Oil Polyurethane Matrix Composites Reinforced with Jute Fabric: José Machado; Juliana Carvalho; Anna Neves; Felipe Lopes; Sérgio Monteiro; Carlos Vieira; 1State University of Northern Rio de Janeiro

4:25 PM
Comparison of Interfacial Adhesion between Polyester and Epoxy Matrix Composites Reinforced with Fique Natural Fiber: Michelle Oliveira; Artur Camposo; Fabio Garcia; Luana Demosthenes; Larissa Nunes; Fabio Braga; Fernanda Luz; Sergio Monteiro; 1Military Institute of Engineering

4:45 PM
Evaluation of the Projectile’s Loss of Energy in Polyester Composite Reinforced with Fique Fabric: Artur Camposo Pereira; Sergio Monteiro; Michelle Oliveira; Fabio da Costa Garcia Filho; Foluke Salgado de Assis; 1Military Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Heterostructured Materials II: Processing and Properties

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Monday PM | March 11, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Elias Alfatih, Aristotle University of Thessaloniki; Hyoung Seop Kim, Pohang University of Science and Technology; Nobuhiro Tsuji, Kyoto University; Jason Trelewicz, Stony Brook University

2:30 PM Invited
Superior Mechanical Properties in Alloys Having Heterogeneous Microstructures: Nobuhiro Tsuji; 2Kyoto University

2:55 PM
How to Play with Grain Size and Texture to Tune Mechanical Properties of Architectured Materials: The Case of Cu-Nb (Nanocomposite Wires: Ludovic Thilly; Pierre-Olivier Renault; Florence Lecouturier; 1University Of Poitiers; 2LNCMI

3:15 PM
Deformation Instability in the Layered Steel Sheet: Hyoung Seop Kim; Jung Gi Kim; Hak Hyeon Lee; Sunghak Lee; 1Postech

3:35 PM
Architectured Steel Sheets through Localized Laser Processing: Pierre Lapouge; Justin Dierrenberger; Matthieu Schneider; 1IPMM, Arts et Métiers-ParisTech/CNAM/CNRS UMR 8006

3:55 PM Break

4:15 PM
Gradient and Fractional/Fractal Models for Heterogeneous Plastic Flow at Micro/Nano Scales: Elias Alfatih; 1Aristotle University of Thessaloniki

4:35 PM
Structural, Phase and Geometrical Heterogeneity in Metallic Materials Processed by Severe Plastic Deformation: Alexander Zhilyaev; Jose Maria Cabrera; Terence Langdon; 1Laboratory for Mechanics of Gradient Nanomaterials, Nosov Magnitogorsk State Technical University; 2Departamento de Ciencia de los Materiales e Ingenieria Metalurgica, EEBE – Universitat Politècnica de Catalunya; 3Materials Research Group, Department of Mechanical Engineering, University of Southampton

4:55 PM
Interface Mediated Mechanistic Transitions in Crystalline-amorphous Nanolaminates: Jason Trelewicz; 1Stony Brook University

5:15 PM Invited
Plastic Flow and Fracture in Harmonic-structured Materials: Dmytro Orlov; 1Lund University
**ADVANCED MATERIALS**

High Entropy Alloys VII — Structures and Characterization

**Sponsored by:** TMS: Alloy Phases Committee

**Program Organizers:** Xie Xie; FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

**Monday PM | March 11, 2019
207B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Michael Bakas, U.S. Army Research Office; Mitra Taheri, Drexel University

2:30 PM Invited
Precipitation and Strengthening in AlCoCrFeNi High Entropy Alloys as Studied by Atom Probe Tomography: Keith Knipling; Richard Michi; Peter Liaw; Naval Research Laboratory; Northwestern University; The University of Tennessee, Knoxville

2:50 PM Invited
Microstructural Engineering in Refractory High Entropy Alloys: Vishal Soni; Bharat Gwalani; Talukder Alam; Oleg Senkov; Daniel Miracle; Rajarshi Banerjee; University of North Texas; UES Inc; Air Force Research Laboratory

3:10 PM Invited
Measurement of Lattice Distortion in High Entropy Alloys: Yi-Chia Chou; Yi Chou; Chanho Lee; Shih-Jie Lin; Peter Liaw; National Chiao Tung University; University of Tennessee; National Tsing Hua University & Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Chiaiyi

3:30 PM Invited
Surface Tension and Viscosity of FeCoCrNiTa and Al0.1CoCrFeNi Measured by the Oscillating Drop Method in an Electromagnetic Processing Device under Reduced Gravity: Markus Mohr; Rainer Wunderlich; Peter Liaw; Livio Battezzati; Hans-Jörg Fecht; Ulm University; The University of Tennessee; Università di Torino

3:50 PM Invited
Screening Ultra-high Temperature Refractory High Entropy Alloys: William Yi Wang; Haixuan Wang; Deye Lin; Jun Wang; Shun-Li Shang; Jiawei Wei Wang; Chengxiong Zou; Bin Tang; Hongchao Kou; Hailong Song; Chuang Dong; Xi dong Hu; Zhenhai Xia; Yiguang Wang; Peter Liaw; Jinshan Li; Zi-Kui Liu; Northwestern Polytechnical University; Institute of Applied Physics and Computational Mathematics, Beijing; Pennsylvania State University; Zhejiang University; Dalian University of Technology; University of Science and Technology Beijing; University of Tennessee, Knoxville

4:10 PM Break

4:30 PM Invited
Quantitative Analysis of Local Lattice Distortion in Refractory High-entropy Alloys: Yang Tong; Shujian Zhao; Hongbin Bei; Takeshi Egami; Yanwen Zhang; Fuxiang Zhang; Oak Ridge National Laboratory

4:50 PM Invited
Microstructure and Property Characterization of High Entropy Alloy Using Advanced Transmission Electron Microscopy Techniques: Mengkun Tian; Chan Ho Lee; Peter Liaw; Joshua Kacher; Georgia Institute of Technology; University of Tennessee, Knoxville

5:10 PM Direct Observation on the Influence of Secondary Phases on the Oxidation Resistance of AlxCrFeNi High Entropy Alloys Using an In-situ TEM Approach: Elaf Anber; Andrew Lang; Wayne Harlow; Dan Scott D’Antuono; Haoyan Diao; Peter Liaw; Mitra Taheri; Drexel university; University of Tennessee

**ADVANCED MATERIALS**

High Entropy Alloys VII — Structures and Mechanical Properties I

**Sponsored by:** TMS: Alloy Phases Committee

**Program Organizers:** Xie Xie; FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

**Monday PM | March 11, 2019
206B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Yanfei Gao, University of Tennessee, Knoxville; C. CEM Tasan, Massachusetts Institute of Technology

2:30 PM Invited
High or Medium Entropy Alloys: Bridging the Compositional Complexity and Mechanical/Physical Properties: Yanfei Gao; Hongbin Bei; University of Tennessee

2:50 PM Invited
Mechanically- or Thermally-induced Forward / Reverse Transformations in a Metastable Dual-phase High-entropy Alloy: C. Tasan; Shaolou Wei; Massachusetts Institute of Technology

3:10 PM Invited
BCC-FCC Interfacial Effects on Plasticity and Strengthening Mechanisms in High Entropy Alloys: Jeff DeHosson; University of Groningen

3:30 PM Invited
Microstructural Analysis of High Entropy Alloys in Extreme Environments: Mitra Taheri; Drexel University

3:50 PM Atom Clusters Enhance Strength and Ductility in High-entropy Alloys: Dongke Chen; Qian Yu; Ting Zhu; Georgia Institute of Technology; Zhejiang University

4:10 PM Break

4:30 PM Invited
A heterostructured Single-phase High-entropy Alloy with an Outstanding Combination of Strength and Ductility: Zhiqiang Fu; Benjamin MacDonald; Zhiming Li; Zhenfei Jiang; Weiping Chen; Yizhang Zhou; Enrique Lavermia; University of California Irvine; Max-Planck-Institut für Eisenforschung; South China University of Technology

4:50 PM Invited
Possibility of Microstructure Control by Thermo-mechanically Controlled Processes in High Entropy Alloys: Nobuhiko Tsujii; Nokun Park; Tilak Bhattacharjee; Shuhei Yoshida; Rajeshwar Eleti; Yu Bai; Shu Kurokawa; Pinaki Bhattacharjee; Kyoto University; Yeungnam University; ESISM, Kyoto University; Indian Institute of Technology Hyderabad

5:10 PM Microstructures and Properties of As-Cast Al₆₀Cr₃₄FeMnV, Al₆₀CrFeTiV, and Al₆₀CrMnTIV High Entropy Alloys: Richard Michi; Keith Knipling; Northwestern University; Naval Research Laboratory
5:30 PM Invited
Understanding Short-range Ordering in High-entropy Alloys: Wei Chen1; George Kim1; Chanhoo Lee2; Peter Liaw2; 1Illinois Institute Of Technology; 2University of Tennessee

MATERIALS DESIGN
Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment — Interfacial Thermodynamics and Kinetics II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Monday PM | March 11, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Timofey Frolov, Lawrence Livermore National Laboratory; Rodrigo Freitas, Stanford University

2:30 PM Invited
Rational Design of Surfaces and Nanoparticles Using Cluster Expansions: Tim Mueller1; 1Johns Hopkins University

3:00 PM Invited
Structure and Dynamics of Chemically Heterogeneous Metal-Solid-liquid Interfaces: Yang Yang1; Mark Asta2; Brian Laird3; 1East China Normal University; 2University of California - Berkeley; 3University of Kansas

3:30 PM Invited
Using Phase Field Simulations to Determine Grain Boundary Properties: Jin Zhang1; Yubin Zhang1; Henning Poulsen1; Peter Voorhees1; 1Danish Technical University; 2Northwestern University

4:00 PM Break

4:20 PM Invited
Kinetic Coefficients for Dipolar Molecular Crystal Growth from the Melt: Yang Yang1; Xianqi Xu1; Jeff Hoyt2; Brian Laird3; Mark Asta4; 1East China Normal University; 2McMaster University; 3University of Kansas; 4UC Berkeley

4:50 PM Invited
Effect of Point Defects on Nucleation and Solid-liquid Interface Migration: Huajing Song1; Yang Sun1; Feng Zhang1; Mikhail Mendeleev1; Cai-Zhuang Wang1; Kai-Ming Ho1; 1Ames Laboratory

5:20 PM Invited
Dendrite Orientation Transition Controlled by Liquid Composition: Lei Wang1; Jeff Hoyt1; Nan Wang1; Nikolas Provatas2; Chadwick Sinclair1; 1The University of British Columbia; 2McMaster University; 3Northwestern Polytechnical University; 4McGill University

ADVANCED MATERIALS
High Entropy Alloys VII — Structures and Modeling II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday PM | March 11, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: Oleg Senkov, UES, Inc; Katharine Flores, Washington University

2:30 PM Invited
Identification of Single Phase, Multi-principal Element Alloys Using First-principles Calculations and High-throughput Experiments: Mu Li1; Rohan Mishra2; Katharine Flores3; 1Washington University

2:50 PM Invited
Simulations and Modelling of the Core Structure and Mobility of a/2[111] Dislocations in Ternary Multicomponent Alloys, TiZrNb, TiZr0.5Nb1.5 and TiZr1.5Nb0.5: Satish Rao1; Brahim Akdim2; Edwin Antillon3; Christopher Woodward4; Oleg Senkov5; 1Ues Inc; 2Air Force Research Laboratory

3:10 PM
The Role of Short-range Order on the Dislocation Behavior in BCC and FCC Multicomponent Solid Solution Alloys Using Atomistic Simulations: Edwin Antillon1; Satish Rao1; Christopher Woodward2; Brahim Akdim3; Triplicane Parthasarathy4; 1Ues Inc; 2AFRL

3:30 PM
Band Structure Theory of the BCC to HCP Burgers Distortion: Bajun Feng1; Michael Widom1; 1Carnegie Mellon University

3:50 PM Break

4:10 PM
An Efficient Computational Method for Calculating Properties of Face-centered Cubic High Entropy Alloys: Alexandra Scheer1; Joshua Strother1; Chelsey Hargather1; 1New Mexico Institute of Mining and Technology; 2New Mexico Institute of Mining and Techersity

4:30 PM
Deformation Behavior and Constitutive Law of CoCrFeMnNi Alloy and Its Variants: Julia Olszewska1; Julien Favre1; Anna Fraczkiewicz2; Jean-Denis Mithieux3; 1 Mines Saint-Etienne; 2APERAM

4:50 PM Invited
Impact of Chemical Fluctuations and Interstitial Alloying on the Stacking Fault Energy of High Entropy Alloys from First Principles: Yuji Iheda1; Fritz Körmann1; Jörg Neugebauer1; 1Max-Planck-Institut für Eisenforschung GmbH

5:10 PM
Computational and Machine Learning Approach to Determine Mechanical Properties of High Entropy Alloys Based on Ni-Mo-W-Re and Mo-Ta-Nb-W-Ti: Amrita Mishra1; Yizhou Lu1; Gautam Priyadarshan1; 1University of Mississippi

5:50 PM
Kinetic Coefficients for Dipolar Molecular Crystal Growth from the Melt: Yang Yang1; Xianqi Xu1; Jeff Hoyt2; Brian Laird3; Mark Asta4; 1East China Normal University; 2McMaster University; 3University of Kansas; 4UC Berkeley

6:00 PM
Effect of Point Defects on Nucleation and Solid-liquid Interface Migration: Huajing Song1; Yang Sun1; Feng Zhang1; Mikhail Mendeleev1; Cai-Zhuang Wang1; Kai-Ming Ho1; 1Ames Laboratory

6:30 PM
Dendrite Orientation Transition Controlled by Liquid Composition: Lei Wang1; Jeff Hoyt1; Nan Wang1; Nikolas Provatas2; Chadwick Sinclair1; 1The University of British Columbia; 2McMaster University; 3Northwestern Polytechnical University; 4McGill University
CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Structure-property Linkages

**Sponsored by:** The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abduljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

**Monday PM | March 11, 2019**

**302C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Murray Daw, Clemson University; Simon Phillpot, University of Florida

2:30 PM Invited
From Computing Grain Boundary “Phase” Diagrams to Understanding Grain Boundary Embrittlement: Chongze Hu1; Jian Luo2; 1University of California San Diego

3:00 PM
A Non-parametric Approach to Reconstruct Grain Boundary Energy from Triple Junction Geometries: Yu-Feng Shen; Xiaoting Zhong; He Liu; Robert Suter; Gregory Rohrer; Carnegie Mellon University

3:20 PM
Formation Reactions of Intermetallic Compound Layers in Pure Fe / Molten Zn Diffusion Couple Held at 450\(^\circ\)C: Kwangsik Hart; Inho Lee; Ikuo Ohnuma; Yisuyuki Hayakawa; Ryosuke Kainuma; Tohoku University/Dept. Material Science; National Institute for Materials Science (NIMS); JFE Steel Co.

3:40 PM
Shear Induced Motion of Twin Boundaries in Mg via Disconnection Terrace Nucleation, Growth and Coalescence: Douglas Spearot; Laurent Capolungo; Carlos Tomé; University of Florida; Los Alamos National Laboratory

4:00 PM Break

4:20 PM Invited
Grain Boundary Phases in Bcc Metals: Timofey Frolov; Qiang Zhu; Wahyu Setyawan; Tomas Oppelstrup; Richard Kurtz; Jaime Marian; Artem Oganov; Rudd Rudd; Lawrence Livermore National Laboratory; UNLV; IPNL; UCLA; Stony Brook University

4:50 PM
A New Approach for Interfacial Classification: Structural Descriptors of Atomic Grain Boundaries: Jacob Tavernier; Garritt Tucker; Edward Kober; Colorado School Of Mines; Los Alamos National Laboratory

5:10 PM
Connecting Atomic and Crystallographic Structure-property Relationships of Grain Boundaries: Jonathan Friedeman; Conrad Rosenbrock; Oliver Johnson; Eric Homer; Brigham Young University

5:30 PM
Characterization of Interfaces of Platinum Nanoparticles in Gamma Alumina Using Transmission Electron Microscopy and Density Functional Theory: Arielle Clauser; Koit Oware Sarfo; Ali Rise; Colin Ophus; Raquel Giulian; Liney Arnadottir; Melissa Santala; Oregon State University; National Center Electron Microscopy; Universidade Federal do Rio Grande do Sul

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Fe and FeCr Based Alloys

**Sponsored by:** TMS: Phase Transformations Committee

**Program Organizers:** Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

**Monday PM | March 11, 2019**

**214B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Julie Tucker, Oregon State University; Pär Olsson, KTH Royal Institute of Technology

2:30 PM Invited
Influence of Irradiation Conditions on Precipitation Behavior in Fe-Cr and Ni Alloys: Elaina Reese; Li-Jen Yu; Nathan Almirall; Khalid Hattar; Takuya Yamamoto; G. Robert Odette; M. Grace Burke; Emmanuelle Marquis; University of Michigan; University of California Santa Barbara; Sandia National Laboratory; University of Manchester

2:55 PM
Ion Irradiation Induced Alpha Prime Precipitate Formation in High Purity Fe-Cr Alloys: Yajie Zhao; Arunodaya Bhattacharyya; Steven Zinkle; University of Tennessee; Oak Ridge National Laboratory

3:15 PM
Heterogeneous Damage Structures in Neutron, Proton and Ion Irradiated FeCr Alloys: Jack Haley; Steve Roberts; Sergio Lozano-Perez; G. Odette; University of Oxford; University of California Santa Barbara

3:35 PM
Atomic Scale Modeling of the Effect of Forced Atomic Reactions on the Thermodynamic and Kinetic Properties of Fe-based Alloys under Irradiation: Liangzhao Hu; Luca Messina; Thomas Schuler; Maylise Nastar; DEN-Service de Recherches de Métallurgie Physique, CEA, Université Paris-Saclay; KTH Royal Institute of Technology, Nuclear Engineering

3:55 PM Break

4:15 PM Invited
Kinetics of Point Defects under Irradiation: From Atomic to Cluster Scales: Thomas Schuler; Luca Messina; Maylise Nastar; Pascal Bellon; Dallas Trinkle; Robert Averback; CEA/SRMP; KTH; University of Illinois at Urbana-Champaign

4:40 PM
Parametric Study of Swelling Behavior with Cluster Dynamics of 15Cr / 15Ni Austenitics Stainless Steels: Adrien Vaugoude; Thomas Jourdan; M-H Mathon; Dominique Thiaudiere; Alexandre Legris; Yann De Carlan; DEN-Service de Recherches Métallurgiques Appliquées (SRMA), CEA; DEN-Service de Recherches de Métallurgie Physique (SRMP), CEA, Université Paris-Saclay; DRF – Laboratoire Léon Brillouin, CEA-CNRS, Université Paris-Saclay; Synchrontron SOLEIL - DiffAbs; Unité Matériaux et Transformations – UMR8207 (UMET), Centre National de la Recherche Scientifique – Université Lille 1

5:00 PM
Modeling Temperature Shift for Solute Clustering in T91 when Using Variable Dose Rate Irradiations: Matthew Swenson; Saheed Adisa; University of Idaho
5:20 PM
Modeling Irradiation Induced Phase Transformations in the FeCrAl System: Par Olsson; Ebrahim Mansouri; Christophe Domain; Luca Messina; Nicolas Castin; *KTH Royal Institute of Technology; EDF R&D; SC-CEN

5:40 PM
Microstructure Evolution in Irradiation-tolerant Ultrafine-grained Steels: Haiming Wen; Andrew Hoffman; Jiaqi Duan; *Missouri University of Science and Technology

LIGHT METALS
Magnesium Technology 2019 — Alloy Design and Casting

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Monday PM | March 11, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: Mark Easton, RMIT University; Wilhelmus Sillekens, European Space Agency

2:30 PM
Bimodal Casting Process of Eco-Mg Series Alloys by Vertical High-speed Press Machine: Fabrizio D’Errico; Politecnico Di Milano Politecnico Di Milano

2:50 PM
Investigation of the Evolution of the Microstructure in the Directionally Solidified Long-period-stacking-ordered (LPSO) Magnesium Alloy as a Function of the Temperature: Daria Drozdenko; Kristian Mathis; Stefanus Harjo; Wu Gong; Kazuya Aizawa; Michiaki Yamasaki; *Kumamoto University; Nuclear Physics Institute of the CAS; Japan Atomic Energy Agency; Kyoto University

3:10 PM
TEM Studies of In Situ Formation of MgO and Al4C3 During Thixomolding of AZ91 Magnesium Alloy Conducted at CO2: Lukasz Roga; Lidia Litynska-Dobrzynska; Boguslaw Baran; *Institute Of Metallurgy And Materials Sc

3:30 PM
FFF of Mg-alloys for Biomedical Applications: Martin Wolff; Torben Mesterknecht; Andre Bals; Thomas Ebel; Regine Willumeit Romer; Helmholtz-Zentrum Geesthacht

3:50 PM
Effects of Gd/Y Ratio on the Microstructures and Mechanical Properties of Cast Mg-Gd-Y-Zr Alloys: Jingli Li; Di Wu; Rongshi Chen; *Institute of Metal Research, Chinese Academy of Sciences

4:10 PM Break
4:30 PM Poster Pitch Session
MATERIALS PROCESSING

Materials Processing Fundamentals — Steel - Microstructure and Properties

**Sponsored by:** TMS: Process Technology and Modeling Committee

**Program Organizers:** Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novels

**Monday PM | March 11, 2019**

212A | Henry B. Gonzalez Convention Center

**Session Chairs:** Antoine Allanore, MIT; Guillaume Lambotte, Boston Metal

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2:30 PM Introductory Comments

2:35 PM

**A New Alloy System Having Autogenous Grain Pinning at High Temperature:** The Zhou; Hatem Zurob; Ronald O’Malley; Stelco, Inc.; McMaster University; Missouri University of Science & Technology

**Understanding the First Formation Stages of Nano-metallic Oxide Particles in ODS Steels:** Martin Owusu-Mensah; Aurélie Gentils; Stéphanie Jublot-Leclerc; Vladimir Borodin; Joel Ribis; CSNSM, University Paris-Sud. CNRS/IN2P3, Université Paris-Saclay, Orsay, France; NRC Kurchatov Institute and NRNU MEPhI, Moscow, Russia; DEN, SRMA, CEA, Université Paris-Saclay, Gif sur Yvette, France

3:15 PM

**Effect of Casting Temperature on the Surface Finish of Grey Iron Castings:** Izudin Dugic; University of Sweden

3:35 PM

**Carbide Precipitation of TBM Cutter Ring Steel during Tempering:** Shaoying Li; Hanjie Guo; Xiao Shi; Mingtao Mao; University of Science and Technology Beijing

3:55 PM Break

4:15 PM

**Study on Hot Deformation Behavior and Processing Map of a Cu-bearing 2205 Duplex Stainless Steel:** Tong Xi; Chenguang Yang; Ke Yang; Chinese University of Science and Technology

4:35 PM

**Research on the L2 Control Model Technology of Double Cold Reduction during Continuous Annealing Process:** Wei Guo; Hui Wang; Yanglong Li; Jie Wen; Meng Yu; Fengqin Wang; Shougang Research Institute of Technology

4:55 PM

**Research on Level 2 Rolling Model of Tin Plate Double Cold Reduction Process:** Hui Wang; Wei Guo; Yanglong Li; Fei Chen; Jie Wen; Meng Yu; Qin Wang; Shougang Research Institute of Technology

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NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Microstructure Effects I

**Sponsored by:** TMS: Nuclear Materials Committee

**Program Organizers:** Clarissa Yablinsky, Los Alamos National Laboratory; Assel Alkhleyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

**Monday PM | March 11, 2019**

215 | Henry B. Gonzalez Convention Center

**Session Chairs:** Rampreshad Prabakaran, Pacific Northwest National Laboratory; Cody Miller, Los Alamos National Laboratory

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2:30 PM Invited

**Dose-dependent Ductile to Brittle Transition Temperature in Ferritic Polycrystalline Aggregates: A 3D Dislocation Dynamics Analysis:** Christian Robertson; Yang Li; CEA Université Paris-Saclay

3:00 PM

**Investigating the Effects of Wear in Reactor Environments using Ion Irradiation:** Gene Lucadamo; William Howland; Paolo Zafred; Justin Cook; Ram Bajaj; Richard Smith; Naval Nuclear Laboratory

3:20 PM

**Mechanical Properties and Microstructural Evaluation of a Pilgered Thin-walled OFRAC Tube for Fast Reactor Applications:** Caleb Massey; David Hoelter; Philip Edmondson; Maxim Gussev; Aneop Kini; Baptiste Gault; Kurt Terrani; Steven Zinkle; University of Tennessee Knoxville; Oak Ridge National Laboratory; Max-Planck-Institut für Eisenforschung GmbH

3:40 PM

**Mechanical Properties Retention of Accident Tolerant Fuel Cladding FeCrAl Alloys Following a Quenching Treatment:** Raul Rebalt; Vinyl Gupta; GE Global Research

4:00 PM Break

4:20 PM Invited

**Mechanical and Thermal Behavior of Graphite in Nuclear Reactor Applications:** Anne Campbell; Timothy Burchell; Yutai Katoh; Josina Geringer; Oak Ridge National Laboratory

4:50 PM

**Procedures for the Interpolation of Orientation Distributions from Coarse Grid Experimental Measurements to Fine Grid Finite Element Meshes:** Timothy Barrett; Adnan Eghtesad; Rodney McCabe; Sven Vogel; Marko Knezevic; University of New Hampshire; Los Alamos National Laboratory

5:10 PM

**The Study of Mechanical Behaviour of Materials for the Nuclear Reactor Components in SUSEN Hot Cells:** Mariia Zimina; Petr Švrcula; Pavel Zhanal; Ondrej Libera; Stefan Zaunschirm; Ondrej Srba; Research Center Rež, Ltd.; University of Applied Sciences Upper Austria
NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics II — Grain Boundaries II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewinic, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleoedden, Helmholtz-Zentrum Geesthacht; Siddharta Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Monday PM | March 11, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Josh Kacher, Georgia Institute of Technology; Jordan Weaver, National Institute of Standards and Technology

2:30 PM
Understanding Mechanical Failure of Metal/ceramic Interfaces: Xiaoman Zhang; Yang Mu; Mohammad Dodaran; Shuai Shao; Wen Meng; Collin Wick; Ramu Ramachandran; Louisiana State University; Louisiana Tech University

2:50 PM
Understanding Local Deformation Processes in Al 6061 using a Multiscale Electron Microscopy Approach: Josh Kacher; Yung Suk Jyotirmaya Kar; Jeremy Yoo; Georgia Institute of Technology

3:20 PM
Sulfur Induced Embbrittlement in Nickel: A Molecular Dynamics Approach: Doruk Aksoy; Rémi Dingreville; Douglas E. Spearot; University of Florida; Sandia National Laboratories

3:40 PM
Examining Atomistic Simulations of Grain Boundary – Dislocation Interactions in FCC Nickel: Devin Adams; Eric Homer; David Fullwood; Robert Wagoner; Brigham Young University; Ohio State University

4:00 PM Break

4:20 PM
Systematic Adjustment of Nanotwin Density in Thin Ag Films: Shefford Baker; Nathaniel Rogers; Kenneth Shaughnessy; Cornell University

4:40 PM
Shear-coupled Grain Boundary Migration: Heterogeneous Disconnection Nucleation: Nicolas Combe; Frederic Mompou; Marc Legros; CEMES-CNRS, University of Toulouse

5:10 PM
Strength and Deformation of Au@Ag and Au@Cu Core-Shell Nanocubes: Mehrdad Kiani; Yifan Wang; Wei Cai; Wendy Gu; Stanford University

5:30 PM Invited
[10-12] Twinning Mechanism, Twin-slip and Twin-twin Interaction in Hexagonal Close-packed Magnesium: Bin Li; Peng Chen; University of Nevada, Reno

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — High Temperature and Cryogenic Micromechanics

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afroz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday PM | March 11, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Sandra Korte-Kerzel, RWTH Aachen; Jeff Wheeler, ETH Zurich

2:30 PM Invited
Deformation in the Intermetallic Mg2Ca Laves Phase from Room- to High-Temperature: James Gibson; Christoffer Zehnder; Hanno Rempel; Dennis Gerber; Stefanie Sandlöbes; Sandra Korte-Kerzel; RWTH Aachen

2:55 PM
High Temperature Nanomechanical Characterization of Transition Metal Carbides: Ming Chen; Davide Sangiovanni; Giacomo Po; Suneel Kodambaka; Jeffrey Wheeler; ETH Zurich; Linköping University; University of California, Los Angeles

3:15 PM
Elevated Temperature Nano and Micro-impact of Hard PVD Coatings: Ben Beake; Luis Isern; Jose Endrino; Micro Materials Ltd.; Cranfield University

3:35 PM
High Temperature Responses of Bulk Metallic Glasses in Nanoindentation: Lisa Kraemer; Verena Maier-Kiener; Yannick Champion; Reinhard Pippan; Erich Schmid Institute; Montanuniversität Leoben; CNRS, SIMaP Grenoble

3:55 PM
Material Optimisation for Small Scale Bending Creep by Additive Manufacturing of Cantilevers: Syed Jalali; Faizan Hizazi; Jyotirmaya Kar; Praveen Kumar; Vilram Jayaram; Indian Institute of Science

4:15 PM Break

4:35 PM Invited
Nanomechanical Characterization in Cryogenic Environments: Seok-Woo Lee; University of Connecticut

5:00 PM
Ultrahigh Elastically Compressible Superconductor, CaFe4As2: Guoqiang Song; Vladislav Borisov; William Meier; Keith Dusoe; John Sypek; Roser Valentí; Paul Canfield; Seok-Woo Lee; University of Connecticut; Goethe University; Iowa State University

5:20 PM
Microindentation on Monocrystalline Materials at Low Temperatures: Shunbo Wang; Jilin University

5:40 PM Invited
Thermally Activated Fracture Behavior at the Micron Scale: Johannes Ast; Szilvia Kalácska; Jakob Schwiedrzik; Johann Michler; Xavier Maeder; Empa Materials Science & Technology
**ELECTRONIC MATERIALS**

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials

**XVIII — Phase Formation of Electronic Materials**

*Sponsored by:* TMS: Alloy Phases Committee

**Program Organizers:** Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

**Monday PM | March 11, 2019**

217D | Henry B. Gonzalez Convention Center

**Session Chairs:** Song-Mao Liang, Clausthal University of Technology; Yuan Yuan, Chongqing University; Yu Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

### 2:30 PM Invited

**Study of Metastable Phase Formation for Sputtered Thin Films:** Keke Chang; 1NIMTE, Chinese Academy of Sciences

### 2:50 PM

**A Study of Nickel Metallization on Polyimide Films of Different Structures by All-Wet Process:** Tzu-Jung Liu; Chih-Ming Chen; Ching-Hsuan Lin; Pei-Yu Wu; 1National Chung Hsing University

### 3:10 PM

**The Effects of Electrochemical Parameters on the Physical Properties of Ni- Alloy Electroplating for the High Wear Resistant Materials:** Yong-Su Lee; Hong-Wook Chun; Jaeho Lee; 1Hongik University

### 3:30 PM Invited

**The Design of Magnesium-rare Earth Alloys Based on Thermodynamic Calculations:** Qun Luo; Qian Li; 1Shanghai University

### 3:50 PM Break

### 4:10 PM

**Microstructure Evolution and Physics Properties of Low Silver Copper Alloy Wires during In Situ Composite Preparation:** Yuamwang Zhang; Shusen Wang; Dawei Yao; 1Shanghai Electric Cable Research Institute

### 4:30 PM

**Growth of Nb3Sn and Cu3Al Intermetallic Phases by Reactive Diffusion Process:** Choong-un Kim; Geng Ni; 1University of Texas, Arlington

### 4:50 PM

**Silanization Engineering for Silicon Metallization:** Ping-Heng Wu; Yu-Zhong Lai; Chih-Ming Chen; 1National Chung Hsing University

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**PHYSICAL METALLURGY**

Phase Transformations and Microstructural Evolution — Phase Transformations in Ferrous Alloys

*Sponsored by:* TMS: Phase Transformations Committee

**Program Organizers:** Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhirli Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

**Monday PM | March 11, 2019**

225D | Henry B. Gonzalez Convention Center

**Session Chairs:** Juan Escobedo-Diaz, University of New South Wales; Sophie Primig, University of New South Wales

### 2:30 PM

**Phase Transformations in LDX2404® Duplex Stainless Steel Subjected to Shock Loading:** Raymond Miller; Zakaria Quadrat; Ali Ameri; Con Logos; Paul Hazell; Juan Escobedo-Diaz; 1University of New South Wales; 2Curtin University; 3Outokumpu

### 2:50 PM

**Effect of Cooling Parameters in Long Steel Components during Quenching:** Andrea Mireles-Ramos; Francisco Garcia-Pastor; Francisco Acosta-González; Eddy Alfaro-López; 1CINVESTAV; 2Rassini Suspensiones S.A. de C.V.

### 3:10 PM

**In Situ Characterization of Microstructure Evolution during the Partitioning Step of TRIP-assisted Bainitic Ferrite (TBF) Steel: Influence of Microalloying Addition**:
Zelie Tournoud; Patricia Donnadieu; Gilles Renou; Didier Huin; Alexis Deschamps; 1Genoble Institute of Technology; 2ArcelorMittalMaizieres Research

### 3:30 PM

**Advanced Thermo-mechanical Processing as Tool to Engineer Hierarchical Microstructures in Modern HSLA Steels:** Carina Ledermueller; Sophie Primig; 1University of New South Wales, Sydney

### 3:50 PM

**Co-dependent Pathways of Thermal Aging Degradation of Cast Austenitic Stainless Steels Characterized by Atom Probe Tomography, Electron Microscopy, and Mechanical Testing:** Timothy Lach; Arun Devaraj; David Collins; Emily Barkley; Thak Sang Byun; 1Pacific Northwest National Laboratory

### 4:10 PM Break

### 4:30 PM

**In Situ High Energy X-ray Diffraction Investigation of the Bainitic Transformation in Steels:** Sen Lin; Peter Hedström; 1KTH Royal Institute of Technology

### 4:50 PM

**Effect of Silicon Content on the Dilatometric Behavior of a Medium-carbon Steel:** Alexis Gallegos-Pérez; Octavio Vázquez-Gómez; José López-Soria; Héctor Vergara-Hernández; Edgar López-Martínez; 1Tecnológico Nacional de México / I.T. Morelia; 2Universidad del Istmo
5:10 PM
How Austenitic TRIP Steels Accommodate Strain under Multiaxial Loading: The Effect of Stacking Fault Energy and Deformation State. Efthymios Polatis"; Miroslav Smid; Wei-Neng Hsu; Tobias Panzner; Helena Van Suygenhoven; Paul Scherrer Institute; Paul Scherrer Institute/Ecole Polytechnique Fédérale de Lausanne

5:30 PM
Transformation-resistant Plasticity Versus Transformation-induced Plasticity in a Cost-effective Lightweight Dual-phase Steel. Jie Bok Seo"; Seon Hyeong Na"; Hyo Young Seok Park"; POSTECH; Hyundai MOBIS

**MATERIALS PROCESSING**

**Rare Metal Extraction & Processing — Rare Metals II**

**Sponsored by:** TMS: Hydrometallurgy and Electrometallurgy Committee

**Program Organizers:** Gisele Azimi, University of Toronto; Hojong Kim, The Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, INI LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

**Monday PM | March 11, 2019**

205B | Henry B. Gonzalez Convention Center

**Session Chairs:** Hojong Kim, The Pennsylvania State University; Shaqif Alam, University of Saskatchewan

2:30 PM
Supercritical Fluid Extraction for Urban Mining of Rare Earth Elements. Jiakai Zhang; John Anawati; Yuxiang Yao; Gisele Azimi; University of Toronto

3:05 PM
Keynote
Extraction of Rare Metals from NiMH Batteries. Kivanc Korkmaz; Ake Rasmuson; Kerstin Forsberg; KTH Royal Institute of Technology

3:30 PM
Selective Precipitation of Th and Rare-earth Elements from HCl Leach Liquor. Haydar Günes; Hüseyin Eren Obuz; Murat Alkan; Dokuz Eylül University

3:55 PM
Break

4:15 PM
Improvement of The Pregnant Solution Arranging Method to Recover the Rare Earth Elements. Tatyana Surkova; Bagdaut Kanzhashlyev; Ainur Berkinbayeva; Dinara Yessimova; JSC Institute of Metallurgy and Ore Beneficiation

4:40 PM
Process Optimization of Reducing Ilmenite Using Carbon. Shiju Zhang; Liu Songli; Panzhihua University; Yangtze Normal University

**ADVANCED MATERIALS**

**Refractory Metals 2019 — (III) Welding and W Alloys; (IV) W, Re and Ru**

**Sponsored by:** TMS: Refractory Metals Committee

**Program Organizers:** Eric Taleff, University of Texas at Austin; Martin Heilmaier, KIT Karlsruhe; Kevin Jaansalu, Royal Military College of Canada

**Monday PM | March 11, 2019**

205 | Henry B. Gonzalez Convention Center

**Session Chairs:** Eric Taleff, The University of Texas at Austin; Kevin Jaansalu, Royal Military College of Canada

2:30 PM
Resistance Upset Welding of Refractory Metals. Todd Leonhardt; Ying Ko; Kelly Gould; Nick Lance; Rhenium Alloys Inc.; EWI

2:50 PM
Nanostructured Two-phase Tungsten Alloys for High Temperature Applications. Alexander Knowles; University of Birmingham, UK

3:10 PM
Analyses of Intrinsic Ductility of W-Ta and W-Re Alloys Based on AB Initio Calculations. Chaoming Yang; Liang Qi; University of Michigan

3:30 PM
Microstructural Changes and Related Surface Damage of Tungsten Rhenium Alloys Caused by Electron Beam Loading. Maximilian Siller; Alexander Leitner; Jürgen Schatte; University of Erlangen-Nuremberg; NASA Glenn Research Center; PMET 

3:50 PM
Break

4:10 PM
Fabrication of Ruthenium-Tungsten Alloy Wires by the Alloy-Micro-Pulling-Down Method. Rikitake Murakami; Kei Kamada; Shunsuke Kurosawa; Yuji Ohashi; University of Tohoku

4:30 PM
Plastic Deformation Behavior of HCP Rhenium: Slip and Twinning. M Arul Kumar; Anil Kumar; Josh Kacher; Rodney McCabe; Irene Beyerlein; Los Alamos National Laboratory; Georgia Institute of Technology; University of California, Santa Barbara

4:50 PM
Strength and Ductility of Powder Consolidated Ultrafine-grain Tantalum. Zachary Levin; Xiaoxi Wang; Murat Kaynak; Ibrahim Karaman; Karl Hartwig; Air Force Research Laboratory; Xuzhou University of Technology; Texas A&M University
ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Secondary and Byproduct Beneficial Use

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

Monday PM | March 11, 2019
007C | Henry B. Gonzalez Convention Center

Session Chairs: Elsa Olivetti, Massachusetts Institute of Technology; Sumedh Gostu, Air-Liquide

2:30 PM Introductory Comments

2:35 PM Invited

3:00 PM Invited
Ferro-alloy Production from Spent Petroleum Catalysts by Reductive Smelting and Selective Oxidation Processes: Jong-Jin Pak1; Do-Hyeong Kim1; Min-Kyu Paek2; Yong-Dae Kim3; Hanyang University; 1Aalto University; 2Golden River Co.

3:25 PM
Reactivity of Crystalline Slags in Alkaline Solution: Brian Traynor1; Hugo Uvegi1; Piyush Chaunsali2; Elsa Olivetti3; Massachusetts Institute of Technology; 1IIIT Madras

3:45 PM
Extraction of Zinc, Silver and Indium via Vaporization from Jarosite Residue: Stefan Steinlechner1; Jürgen Antrekowitsch2; Montanuniversität Leoben

4:05 PM Break

4:25 PM
Efficient Utilization of Zinc Lead and Copper Containing By-products: Jürgen Antrekowitsch1; 1University of Leoben

4:45 PM
Production of High Purity Mo and Fe-Mo Alloys from Recycled Mo Oxide and Mill Scale through Hydrogen Reduction: Min-Kyu Paek1; Do-Hyeong Kim1; Daniel Lindberg1; Jong-Jin Pak2; Aalto University; 1Hanyang University

5:05 PM
Alkal Elution of Various Mineralogical Phases in Steelmaking Slag: Zuoqiao Zhu1; Xu Gao1; Shigeru Ueda1; Shin-ya Kitamura1; Tohoku University

5:25 PM
Feasibility Assessment for Recycling Copper Slag as Ferrous By-products in FINEX®, an Alternative Ironmaking Process: Moo Eob Cho1; Taehyeok Kim1; POSCO

5:45 PM
Development of Electromagnetic Interference Materials from Metallurgical Wastes: Yong Fan1; TU Freiberg

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell’s 80th Birthday — Casting Defects and Their Characterization

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Murat Tiryakioğlu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Monday PM | March 11, 2019
006B | Henry B. Gonzalez Convention Center

Session Chair: Xinjin Cao, National Research Council Canada

2:30 PM
Determining Casting Defects in Thixomolding Mg Casting Part by Computed Tomography: Jiehua Li1; Bernd Oberdörfer2; Peter Schumacher3; 1Montanuniversität Leoben; 2Austrian Foundry Institute

2:55 PM
The Effect of the Addition of Transition Metals on Double Oxide Film Defects in an Al-Si-Mg Alloy: William Griffiths1; Adrian Cadén2; 1University of Birmingham, UK

3:20 PM
On Estimating Largest Defects in Castings: Murat Tiryakioğlu1; Irsl Nini1; 1University of North Florida

3:40 PM
Ti Grain Refinement Myth and Cleanliness of A356 Melt: Özen Gürsoy1; Eray Erzi1; Derya Dispınar1; 1Istanbul University

4:00 PM Break

4:20 PM
On the Effects of Defects and Imperfections on Tensile Toughness of a Secondary Aluminium Alloy: Jakob Olofsson1; Anton Bjurenstedt1; Salem Seifeddine1; 1Jonkoping University; 2Swerea SWECAST

4:40 PM
The Myth of Hydrogen Pores in Aluminum Castings: Murat Tiryakioğlu1; 1University of North Florida

5:00 PM
Casting Defect Analysis on Fracture Surface of 356 Aluminium Alloy: Özen Gürsoy1; Eray Erzi1; Derya Dispınar1; 1Istanbul University

5:20 PM
Investigation of Casting Quality Change of A356 by Duration in Liquid State: Mikdat Gurtaran1; Muhammet Uludag2; Derya Dispınar1; 1Bursa Technical University; 2Istanbul University

5:40 PM
Characterization of the Effect of Sr and Ti on Liquid Quality in Al8Si3Cu: Muhammet Uludag2; Derya Dispınar1; Murat Tiryakioğlu1; 1Bursa Technical University; 2Istanbul University; 3University of North Florida
LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — In-situ Observation and Simulation of Grain Formation

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Monday PM | March 11, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Zhongyun Fan, Brunel University; Mark Jolly, Cranfield University

2:30 PM Keynote
4D Synchrotron Imaging Insights into Grain Formation: Peter Lee1; Biao Cai2; Mohammad Azeem1; Enyu Guo3; David St John4; 1University College London; 2University of Birmingham; 3Dalian University of Technology; 4University of Queensland

2:50 PM Keynote
X-Ray Synchrotron Radiography Investigations of Primary and Secondary Phase Nucleation in Aluminum Alloys: Enzo Lotti1; Andrew Lui2; Patrick Grant3; 1University of Oxford

3:10 PM Invited
$\delta$$'\rightarrow$ transformation during / after $\delta$ dendritic solidification in Fe-Cr-Mn-alloys: time-resolved 2D / 3D imaging: Hideyuki Yasuda1; Takahiro Hashimoto1; Naoki Sei1; Kohki Morishita2; Masato Yoshiya3; 1Kyoto University; 2Osaka University

3:30 PM
Four-phase Eutectic Topology in Solidification Rosettes: Djarr Oquab1; Claudie Josse2; Arnaud Proietti2; Alessandro Pugliara3; Jacques Lacaze4; 1CIRIMAT; 2UMS Castaing; 3CNRS

3:50 PM
In Situ Observation of Hyperbranched Dendrites in Aluminum Alloys: Tiberiu Stan1; Yue Sun2; Kate Eldert1; Xianghui Xiao3; Peter Voorhees1; 1Northwestern University; 2Argonne National Laboratory

4:10 PM Break

4:20 PM
In Situ Observation of Nanoparticle-enabled Diffusion Control by High-speed Synchrotron X-ray Imaging: Joseph Volpe1; Qin Qin2; Qilin Guo1; Cang Zhao1; Lianghua Xiong1; Tao Sun2; Liangyi Chen1; 1University of California; 2University of South Carolina

4:40 PM Invited
Numerical Modeling of Heterogeneous Nucleation Behavior of Equiaxed Grains during Directional Solidification: Lang Yuan1; David StJohn2; Arvind Prasad3; Peter Lee4; 1University of South Carolina; 2The University of Queensland; 3University College London

5:00 PM Invited
Phase-field Studies of the Interplay between Nucleation and Growth in Light Metal Alloys: Janin Elken1; 1Access E.V.

5:20 PM
Understanding Compositional Effects of Dendritic Solidification via Directional Solidification and Cellular Automaton Simulation: Colin Ridgeway1; Cheng Gu2; Alan Luo1; 1Ohio State University

5:40 PM
Heterogeneities in Homogeneous Nucleation during Solidification of Pure Metals by Atomistic Simulations: Mohsen Asle Zaeem1; Avik Mahata2; Michael Baskes3; 1Colorado School of Mines; 2Missouri University of Science and Technology; 3University of California, San Diego

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session II

Sponsored by: TMS Functional Materials Division. TMS Structural Materials Division, TMS: Advanced Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchao Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhipti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday PM | March 11, 2019
301A | Henry B. Gonzalez Convention Center

Session Chairs: Robert Wheeler, Microtesting Solutions LLC; Somuriprasad, Sandia National Laboratories

2:30 PM Keynote
Direct Visualization of Kirkendall Voids at Cu-Au Interfaces from In-situ TEM Heating Studies: Somuriprasad1; Paul Kotula2; Fadi Abdeljawad3; 1Sandia National Laboratories

3:10 PM
Dislocation Pile-ups at B1 Precipitate Interfaces in Mg-rare Earth (RE) Alloys: Zhihua Huang1; Amit Misra2; John Allison3; Chaoming Yang1; Liang Qi1; 1University of Michigan

3:30 PM
Imaging Short Range Order in Ti-6Al with TEM/STEM Techniques: Ruopeng Zhang1; Colin Ophus2; Thomas Pekin3; Burak Ozdogan4; Max Poschmann1; Yu Deng1; Shradhha Vachhani4; Mark Asta1; Daryl Chrzan1; Andrew Minor1; 1University of California Berkeley; 2Lawrence Berkeley National Laboratory; 3Namjing University; 4Buerke Nano Surfaces

3:50 PM
Nanoscale Plastic Wear of Olivine Investigated by In Situ TEM: Eric Hintsala1; Sanjit Bhowmick1; Douglas Stauffer1; S. A. Syed Asif1; 1Bruker Nano Surfaces

4:10 PM Break

4:30 PM Keynote
A Multi-scale In Situ Approach to Understanding the Collective Deformation of Ferroelastic Polycrystalline Ceramics: Charles Smith1; Jessica Krogstad2; 1University of Illinois Urbana-Champaign

5:10 PM
Deformation Mechanism Maps for Submicron Aluminum at Elevated Temperatures: Degang Xie1; Rongrong Zhang1; Zhiwei Shan1; 1Xian Jiaotong University

5:30 PM
Operando STEM Guide Catalyst Regeneration Method Development: Jing Kang1, Jae-Soon Choi2, Theodore Krause1; Jeffrey Miller1; Franklyn Tao1; Susan Habas3; 1Oak Ridge National Laboratory
10:15 AM Break
10:35 AM Influence of Mold Slags with Different Reactivities on the Erosion Rate of ZrO2-C Bearing Submergence Entry Nozzle: Xuesi Wang; Qian Wang; Changping Zeng; Huazhi Yuan; Chongqing University

10:55 AM A New Method for Determining High-temperature Wettability of Bonding Phase: Yijia Dong; Li Guanqghui; Chen Liu; Qiang Zhong; Hu Sun; Jun Luo; Tao Jiang; Central South University

11:15 AM Thermodynamic Modelling of Solidification and Viscosity studies of Titania Slag: Saida Shaik; Tarun Kundu; IIT Kharagpur

11:35 AM Concluding Comments

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Nanomaterials and Catalysts

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, CSIRO; John Howarter, Purdue University; Neale Neelameggham, IND LLC

Tuesday AM | March 12, 2019
007D | Henry B. Gonzalez Convention Center

Session Chair: Neale Neelameggham, IND LLC

8:30 AM Metal Oxides Nanostructures for Energy Applications: Zi qi Sun; Queensland University of Technology

8:50 AM Effect of Biomaterial (Citrus lanatus Peels) Nanolubricant on the Thermal Performance and Energy Consumption of R600a in Refrigeration System: Oluseyi Ajayi; Covenant University

9:10 AM Two-dimensional Materials and their Hybrids in Energy Applications: Ting Liao; Ziqi Sun; Queensland University of Technology

9:30 AM Calcium-looping Lime Production: An Energy-efficient and Cost-effective Approach for Decarbonisation of the Steelmaking Industry: Sicong Tian; Macquarie University

9:50 AM Break

10:10 AM Performance and Energy Consumption Analyses of R290/Bio-based Nanolubricant as a Replacement for R22 Refrigerant in Air-conditioning System: Oluseyi Ajayi; Covenant University

10:30 AM Characterizations of Manganese-based Desulfurated Sorbents for Flue Gas Desulfurization: Yanni Xuan; Qingbo Yu; Kun Wang; Wenjun Duan; Northeastern University
SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Solidification Processing

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Tuesday AM | March 12, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Bryan Webler, Carnegie Mellon University; Caizhi Zhou, Missouri University of Science and Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS


Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jyoungh Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Tuesday AM | March 12, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: SungWoo Nam, University of Illinois at Urbana-Champaign; Jie Yao, University of California, Berkeley

8:30 AM Invited
Solution Based Preparation of van der Waals Materials and their Heterostructures: Jie Yao; 1University of California Berkeley

9:00 AM
High-throughput Optical Thickness and Size Characterization of 2D Materials: William Dickinson; Hannes Schniepp; 1The College of William & Mary

9:20 AM
The Effect of Processing Conditions on the Growth of Transition Metal Dichalcogenides by Molecular Beam Epitaxy: Peter Litwin; Stephen McDonnell; 1University of Virginia

9:40 AM Invited
2D Materials High-throughput Optical Thickness and Size Characterization of 2D Materials: William Dickinson; Hannes Schniepp; 1The College of William & Mary

10:00 AM Break

10:20 AM Invited
Prediction of Porosity Formation during Directional Solidification of Nickel-based Superalloys: Junsheng Wang; Keli Liu; 1Beijing Institute of Technology

10:50 AM
A New Efficient Quantitative Multi-component Phase Field - Lattice Boltzmann Model for Simulating Ti6Al4V Solidified Dendrite under Forced Flow: Weizhao Sun; Yu Xie; Rui Yan; Hongbiao Dong; Tao Jing; 1Key Laboratory for Advanced Materials Processing Technology, Ministry of Education, School of Materials Science and Engineering, Tsinghua University; 2State Key Laboratory of Development and Application Technology of Automotive Steel, Baoshan Iron & Steel Co., Ltd.; 3Department of Engineering, University of Leicester

11:10 AM
Recrystallization and Segregation Phenomena during Equiaxed Dendritic Solidification of Fe-C Alloy: Weiling Wang; Shiwei Yin; Sen Luo; Miaoyong Zhu; 1Northeastern University

11:30 AM
Special Metallurgical Characteristics of Al-Mg-Si Alloy Based on Sub-rapid Solidification Process: Zetian Liu; Cheng Wang; Huiyuan Wang; 1Jilin University

11:50 AM
Nucleation of Heteroepitaxial Recrystallization in Polycrystalline Superalloys: Brady Dowdeii; Victoria Miller; 1North Carolina State University
**ENERGY & ENVIRONMENT**

5th Symposium on Advanced Materials for Energy Conversion and Storage — Functional Materials Including High-temperature Ceramics and Alloys

*Sponsored by:* TMS: High Temperature Alloys Committee

**Program Organizers:** Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

**Tuesday AM | March 12, 2019**

**225A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Jung Pyung Choi, Pacific Northwest National Laboratory; Paul Ohodnicki, National Energy Technology Laboratory

8:30 AM Keynote
Oxide-based Thermoelectric Generators enabled by Additive and Layered Manufacturing: *Sanjay Sampath*; Hwassoo Lee;
1Stony Brook University

9:00 AM Invited
Functional Sensor Material and Device Development for Energy-related Sensing Applications: *Paul Ohodnicki*;
2National Energy Technology Laboratory

9:25 AM Invited
Cold Spray Additive Manufacturing of Thermoelectric Generators: *Alexander Baker*; Richard Thuss;
3Elissaios Stavrout; Joe Zaug;
Scott McCall; Harry Radousky;
4Lawrence Livermore National Laboratory; 2TTEC Thermoelectric Technologies

9:50 AM
Ceramic Encapsulated Metallic (CEM) High Temperature Phase Change Material for Energy Storage: *Brian Jolly*; Jake McMurray;
Austin Schumacher; Stephen Raiman; Edgar Lara-Curzio; Chad Parish;
Oak Ridge National Laboratory

10:10 AM Break

10:30 AM
DOC Stabilized PVAc / MWCNTs Composites for Higher Thermoelectric Performance: Hussein Badr;
Shadi Foad Saber;
Mahmoud Sorour; *Iman El Mahallawi*; Fawzi Elrefaie;
Cairo University; 2Cairo University/British University in Egypt

10:50 AM
Printable and Flexible Heterogeneous Nanostructures for Wearable Thermoelectrics: Zimeng Zhang; *Shiren Wang*;
3Texas A&M University

11:30 AM
Sustainable Hydrogen Generation Enabled through Hydrolysis of Hierarchical Nanoporous Aluminum in Neutral Water: *Eric Detz*;
John Corsi; Jintao Fu; Zeyu Wang;
University of Pennsylvania

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — In Situ Process Monitoring

*Sponsored by:* TMS: Additive Manufacturing Committee

**Program Organizers:** Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Pooranjang, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

**Tuesday AM | March 12, 2019**

**221A | Henry B. Gonzalez Convention Center**

**Session Chair:** Kester Clarke, Colorado School of Mines

8:30 AM Invited
In-situ Monitoring of Directed Energy Deposition and Its Impact on the Development of In-process Control: *Jian Cao*;
Northwestern University

9:00 AM
Differentiating Defect Types in LENS Metal AM via In Situ Pyrometer Process Monitoring: *Tom Stockman*; Judith Schneider;
Cameron Knapp; Caleb Horan; John Carpenter; Kevin Henderson;
Brian Patterson; Los Alamos National Laboratory; University of Alabama in Huntsville

9:20 AM
Process Analysis of Powder Bed AM Using Two Color Pyrometer Data: *John Mitchell*; Thomas Ivanoff;
Daryl Dagel; Bradley Jared;
Jon Madison; Laura Swiler; David Saiz; Josh Koepek;
Sandia National Laboratories

9:40 AM
Comparison of In-situ Pyrometer Analysis with Simulation in Powder Bed Printed Inconel 718: *Lev Chechik*; Iain Todd;
University of Sheffield

10:00 AM Break

10:20 AM
Carnegie Mellon University

10:40 AM
Quantifying Particle-melt Interactions via In-situ high Speed Imaging in Laser Engineered Net Shaping (LENS): *James Haley*; Parvin Kiani; Sen Jiang; Baolong Zheng; Julie Schoenung;
Enrique Lavermia;
University of California Irvine

11:00 AM
Defect Detection in Metal Additive Manufacturing through Application of In-situ Diagnostics: Bradley Jared; *Jonathan Madison*; Laura Swiler; Thomas Ivanoff; Burke Kernen; Jay Carroll; Todd Huber; Maryalbo Matthews; Forien Jean-Baptiste;
Chris Spadaccini; Gabe Guss; Philip Depondo;
John Carpenter; Tom Stockman; Elena Garcia; Phong Du; Ben Brown;
Sandia National Laboratories; Lawrence Livermore National Laboratory;
Los Alamos National Laboratory; Y-12 National Security Complex;
Kansas City National Security Campus
11:20 AM
Influence of Fine Solidification Microstructure on the Radiation Response of 316 Stainless Steels Produced by Laser Powder Bed Fusion and Directed Energy Deposition: Gabriel Meric de Belleforêt1; Kaila Bertsch2; Dan Thoma3; 1University of Wisconsin Madison

11:40 AM
Microstructural Characterization of a Stainless Steel Component Manufactured via Additive Manufacturing: Emmanuel Perez1; Jonathon Rosales-Franco2; Isabella Van Rooyen2; George Griffith3; John Ralls2; Daniel Hebert2; 1Idaho National Laboratory; 2Auburn University; 3Newport News Shipbuilding, A Division of Huntington Ingalls Industries

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Microstructure and Characterization

**Sponsored by:** TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Tuesday AM | March 12, 2019

**Session Chairs:** Subhashish Meher, Idaho National Laboratory; Chad Duty, University of Tennessee

8:30 AM Invited
Alloy 800/800H by Laser Powder Bed Fusion: Xiaoyuan Lou1; Jingfan Yang1; Miao Song1; Mi Wang2; Gary Was3; Raul Rebak4; 1Auburn University; 2University of Michigan; 3GE Global Research

9:00 AM Invited
High Temperature Behavior of Additively Manufactured Inconel 625 Linked to Microstructure through In Situ Neutron Diffraction Experiments: Allison Beese1; Zheqiang Wang2; Alexandru Stoica3; Dong Ma4; 1Pennsylvania State University; 2Kensettmetal; 3Oak Ridge National Laboratory

9:30 AM
Effect of High Initial Dislocation Density Microstructure on the Strain Hardening and Anisotropy of Additively Manufactured 316L Stainless Steel: Jishnu Bhattacharya1; Fulin Wang2; Md Shamsujoh9; James Fitz-Gerald1; Sean Agnew2; 1University of Virginia

9:50 AM
Relations between Microstructure and Oxidation Resistance of an Additively Manufactured Nickel-based Superalloy: Zhenyu Liu1; Sabia Soltanattar1; Brian Gleeson2; Guofeng Wang3; 1University of Pittsburgh

10:10 AM Break

10:30 AM Invited
In-situ Characterization of Solidification: Insights for Understanding Additive Manufacturing: Amy Clarke1; Joseph McKeown2; John Roehling3; Damien Tourret4; Seth Imhoff5; John Gibbs6; Paul Gibbs7; Kamel Zfezza1; Tao Sun1; Michelle Espy1; James Hunter1; Alain Karma2; 1Colorado School of Mines; 2Lawrence Livermore National Laboratory; 3IMDEA Materials; 4Los Alamos National Laboratory; 5Argonne National Laboratory; 6Northeastern University

11:00 AM
In-situ Dual Beam Kr Irradiation and He Implantation in Additively Manufactured 316L SS: Jing Hu1; Shilei Li2; Weiyong Chen3; Peter Baldo1; Mark Kirk1; Meiwei Li1; 1Argonne National Laboratory; 2University of Science and Technology Beijing

11:20 AM
Additive Manufacturing of Metals: Fatigue and Fracture III — Session I

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Nikolas Hrable, National Institute of Standards and Technology - Boulder; Steve Daniewicz, University of Alabama; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Moinen Seifi, ASTM International/Case Western Reserve University

Tuesday AM | March 12, 2019

**Session Chair:** Nima Shamsaei, Auburn University

8:30 AM Invited
A Summary of NASA’s Efforts for the Development of Additive Manufacturing Metallic Materials: Richard Russell1; Eric Burke2; Robert Carter3; Edward Gaessgen4; Bryan Mcmenney5; Karen Taminger6; Douglas Wells7; 1NASA; 2Jet Propulsion Laboratory

9:00 AM
Tensile, Creep and LCF Behavior of SLM Fabricated Inconel 718 in As-fabricated and HIPed Conditions: Sasidhara Periana1; Arnaud Duchosal1; Sébastien Vaudreuil1; Hicham Chibane2; Jonathan Cormier3; Rene Leroy4; 1Gabriel Lamé Laboratory, Université de Tours; 2Euro-Mediterranean University; 3INSA, Strasbourg; 4Institut P - Département de Physique et Mécanique des Matériaux

UFR CNRS 3346 ISAE-ENSMA

9:20 AM
Effect of Internal Hydrogen on the Mechanical Behavior of Additively Manufactured Stainless Steels: Thale Smith1; Joshua Sugar2; Christine Smudde3; Dorian Balch4; Chris San Marchi1; 1Sandia National Laboratories; 2University of California, Davis

9:40 AM
Evolution of Defect Characteristics During In Situ Tensile Loading of a Laser Powder Bed Fusion Processed 316L Stainless Steel Alloy: A Synchrotron X-ray Tomography Study: Hahn Choo1; Kinfing Shang2; Xianghui Xiao3; Derek Morin4; Elena Garlea5; 1University of Tennessee; 2Argonne National Laboratory; 3Y-12 National Security Complex

10:00 AM Break

10:20 AM Invited
Fatigue Assessment of Additively Materials by Means of the Local Strain Energy: Filippo Berto1; 1Norwegian University of Science and Technology

10:50 AM
A Microstructural Investigation on the Crack Initiation Behavior of an Additively Manufactured Austenitic Stainless Steel: Jonathan Pegues2; Michael Roach3; Nima Shamsaei1; 1Auburn University; 2University of Mississippi Medical Center
11:30 AM
About a Digital Twin for the Fatigue Approach of Additively Manufactured Components: Rainer Wagner; Matilde Scurria; Benjamin Möller; Tobias Melz; 2Fraunhofer Institute for Structural Durability and System Reliability LBF; 2Technische University Darmstadt

ADDITIVE TECHNOLOGIES
Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ni-based Systems

Sponsored by: TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

Program Organizers: Biji-Ka Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday AM | March 12, 2019
221C | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Emma White, Iowa State University / Ames Laboratory

8:30 AM Invited
GE Additive – Exploring the Processing-microstructure Connection for Nickel-based Materials: Deborah Whites; Theodore Anderson; Andrew Wessman; Laura Dial; 1General Electric Company

9:00 AM
Microstructural Evolution in Nickel Alloy 718 Produced by Laser-powder Bed Fusion Additive Manufacturing: Hyeyun Song; Alber Sadek; Paul Boutware; Heimdall Mendoza; Rodrigo Enríquez; 1EWI

9:20 AM
The Role of Homogenization in the Post-processing of Inconel 718 Made by Casting and Additive Manufacturing: Yunhao Zhao; Jian Liu; Albert To; Wei Xiong; 1University of Pittsburgh

9:40 AM
Microstructural Stability of Haynes 282 Fabricated by Electron Beam and Selective Laser Melting: Sebastien Dryepondt; Mike Kirka; Kinga Usocni; 1Oak Ridge National Laboratory

10:00 AM Break

10:20 AM Invited
Prismatic Geometries to Components: Challenges in Maintaining Properties and Microstructure in High Gamma Prime Ni-base Superalloys Fabricated by AM. Michael Kirka; Sebastien Dryepondt; Yousub Lee; Peeyush Nandwana; Andres Marques Rossy; Charles Hawkins; Charles Joslin; Obed Acevedo; 1Oak Ridge National Laboratory

10:50 AM
Investigation of Post-processing Heat Treatment on the Mechanical and Microstructural Properties of Nickel-based Superalloy Inconel 718 Manufactured by Laser Powder-bed Fusion: Thomas Gallmeier; Aaron Stebner; Behnam Aminahmadi; 1Colorado School of Mines

11:10 AM
Quantification of Local and Global Residual Stresses in Additively Manufactured Inconel Alloys using Electron Microscopy Techniques: Kathryn Small; Zach Clayburn; David Fullwood; Mitra Taheri; 1Drexel University; 2Bingham Young University

11:30 AM
Effect on Microstructure and Tensile Properties of LPBF IN718 Annealed at 1160 °C: David Newell; Ryan O’Hara; Greg Cobb; Ben Doane; 1Air Force Institute of Technology/ENV

11:50 AM
The Microtexture and Tensile Properties of Continuous-wave and Quasi-continuous-wave Laser Powder Deposited Inconel 718: Zhaoyang Liu; Qiang Zhu; Lijun Song; 1Southern University of Science and Technology; 2Hunan University

CHARACTERIZATION
Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session III

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezalovic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Tuesday AM | March 12, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: Christoph Kirchlechner, Max-Planck-Institut; Daniel Caillard, Centre Natt De La Research Science

8:30 AM Invited
Kinetics of Dislocations, Solid Solution Hardening and Dynamic Strain Ageing in Fe and Fe Alloys: Daniel Caillard; 1Centre Natt De La Research Science

9:00 AM
In Situ Characterization of Dislocation Motion during Hydrogen Diffusion in Steels: Jinwoo Kim; Haoxue Yan; Cemal Cem Tasan; 1Massachusetts Institute of Technology

9:20 AM
Understanding the Alpha-omega Phase Transformation in Titanium and Zirconium using Spherical Nanoindentation and EBSP: Cayla Harvey; Jordan Weaver; Ben Morrow; M. Arul Kumar; Irene Beyerlein; Siddhartha Pathak; 1University of Nevada, Reno; 2National Institute of Standards and Technology; 3Los Alamos National Laboratory; 4University of California, Santa Barbara; 5University of Nevada, Reno

9:40 AM
Dislocation-type Evolution in Quasi-statically Compressed Polycrystalline Metals: Chaoyi Zhu; Tyler Harrington; Olivia Dippo; George Gray III; Kenneth Vecchio; 1University of California San Diego; 2Los Alamos National Laboratory
10:00 AM Break

10:20 AM Invited
Dislocation Slip Transmission through a Coherent \{311\} Copper
Twin Boundary: Strain Rate Sensitivity, Activation Volume and
Strength Distribution Function: Nataliai Malyar1; Blaziej Grabowski1;
Gerhard Dehm1; Christoph Kirchlechner2; Max-Planck-Institut

10:50 AM
Characterization of Dislocation Evolution using Electron
Channeling Contrast Imaging and Its Effect on Superconducting
Properties of Nb: Mingxin Huang1; Shreyas Balachandran2; Santosh
Chetri3; Anatoli Polyanski4; Peter Lee5; Chris Compton5; Thomas
Bieler1; Michigan State University; 6National High Magnetic Field
Laboratory; 7Facility for Rare Isotope Beams

11:10 AM
In Situ Analysis of Dislocation/Grain Boundary Interactions in Mg
Alloys: Mohamed Taher Andani1; John Allison2; Amit Misra3; University
of Michigan

11:30 AM
In Situ EBSD Study on the Influence of Constituent Particles on
Dislocation Accumulation during Deformation of AA6451: 
Yung Suk Jeremy Yoo1; Saadol Das2; Richard Hamerton3; Josh Kacher4;
Georgia Institute of Technology; 5Novelis Inc.

11:50 AM
Nanoindentation for Identification of Phase Change in Nano-
precipitates: Rebecca Wang1; Jaclyn Cann2; Cem Tasan3; University
of Oxford, Massachusetts Institute of Technology; 6Massachusetts
Institute of Technology

ADVANCED MATERIALS

Advanced High-Strength Steels III —
Microstructure, Processing, and Properties of
Advanced High-Strength Steels I

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines;
MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts
Institute of Technology; Kester Clarke, Colorado School of Mines;
Ana Luiza Araujo, AK Steel Research & Innovation

Tuesday AM | March 12, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Xuejun Jin; Shanghai Jiao Tong University;
Benjamin Elyson, Colorado School of Mines

8:30 AM
Are Deformation Twins Important for Twinning-Induced Plasticity
Steel?: MingXin Huang1; University of Hong Kong

8:50 AM
Orientation-dependent Deformation Mechanisms and Twin
Boundary-associated Strengthening in Fe-Mn-C TWIP Steel
Micro-Pillar: Won Seok Choi3; Stefanie Sandlöbes4; Nataliai Malyar3;
Christoph Kirchlechner4; Sandra Korte-Kerzel4; Gerhard Dehm4;
Bruno De Cooman5; Dierk Raabe5; Korea Advanced Institute of
Science and Technology; 3RWTH Aachen University; 4Max-Planck-
Institut für Eisenforschung GmbH; 5NLMK

9:10 AM
Effects of Strain Rates on the Mechanical Properties and
Microstructure in Precipitation Hardening TWinning Induced
Plasticity (TWIP) Steel: Zhenli Mi1; Yonggang Yang2; Zhen Wang1;
Dayuan Zhou1; Huijian Li1; University of Science and Technology
Beijing

9:30 AM
Kinetics of Deformation Processes in High-alloy Cast TRIP/TWIP
Steels Determined by Acoustic Emission and Scanning Electron
Microscopy: Anja Weidner1; Robert Lehnert1; Mikhail Linderov2;
Alexei Vinogradov2; Horst Biermann1; TUBergakademie Freiberg;
Togliatti State University; 2Norwegian University of Science and
Technology

9:50 AM Break

10:10 AM
Phase Transformation and Deformation Behavior in a TRIP Sheet
Steel under Annealing and Tension by Real-time In Situ Neutron
Diffraction: Dunji Yu1; Yan Chen1; Lu Huang2; Ke An2; Oak Ridge
National Laboratory; 3United States Steel Corporation

10:30 AM
An In Situ Neutron Diffraction Study of Stress Partitioning and
Dislocation Strengthening Behavior in TRIP-assisted Bainitic
Steels: Shihui He1; Mingxin Huang1; Kangying Zhu1; University of
Hong Kong

10:50 AM
Tensile Deformation Behavior of 1 GPa-grade TRIP-aided Multi-
structure Steels Studied by In Situ Neutron Diffraction:
Noriyuki Tsuicho1; Takaaki Tanaka2; Yuki Toji3; University of Hyogo;
JFE steel

11:10 AM
Dual Effects of Retained Austenite for Third Generation Advanced
High Strength Steels: Xuejun Jin1; Lianbo Luo2; Wei Li3; Yu Gong1; Qi
Lu2; Jeff Wang2; Charles Mathew Enloe4; Jason Coryell1; Shanghai
Jiao Tong University; 2China Science Lab of Global Research
and Development, General Motors; 4Body and Closure Materials
Engineering of Global Product Integrity, General Motors

11:30 AM
Deformation Behaviors in Multi-phase Steel Composed of Ferrite,
Martensite and Retained Austenite: Avula Lavakumar1; Myeong-
heon Park2; Nobuhiro Tsuji3; Department of Materials Science
and Engineering, Kyoto University; 2Elements Strategy Initiative for
Structural Materials (ESISM), Kyoto University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and
Power Conversion Applications — Application
of Advanced Soft Magnetic Materials in Power
Electronics and Motors

Sponsored by: Federation of European Materials Societies (FEMS),
TMS Functional Materials Division, TMS: Magnetic Materials
Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.;
Paul Ohodnicki, National Energy Technology Laboratory; Alex
Leary, NASA GRC; Orlando Rios, Oak Ridge National Laboratory;
Alessandra Hool, ESM Foundation

Tuesday AM | March 12, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Paul Ohodnicki, National Energy Technology
Laboratory

8:30 AM Invited
High Power-density Rotational Machine Design with Metal
Amorphous Nanocomposite (MANC) Soft Magnetic Material
(SMM)s and for Rare Earth Free Permanent Magnets: Satoru
Suzuki1; Paul Ohodnicki2; Michael McHenry1; Carnegie Mellon
University; 2National Energy Technology Laboratory
8:30 AM Invited Role of Bi, Sb and In in Microstructure Formation and Properties of Sn-Cu-Ni and Sn-Ag-Cu BGA Solder Joints: Sergey Belyakov; Tetsuro Nishimura; Keith Sweatman; Tetsuya Akiwa; Christopher Gourlay; Imperial College London; Nihon Superior Co., Ltd. 9:00 AM Effect of Ag on Mechanical Properties of Sn-Ag-Cu Micro-BGA Joints: Hao Chen; Tzu-Ting Chou; Collin Fleshman; Rui-Wen Song; Jenq-Gong Duh; National Tsing Hua University 9:20 AM Influence of Low Ga and P Additions on the Microstructure and Mechanical Properties of Sn-0.7Cu: Seyed Alireza Torbati Sarraf; Mohd Arif Salleh; H. Yasuda; K. Nogita; Universiti Malaysia Perlis (UniMAP); Kyoto University; University of Queensland (UQ) 9:40 AM Effect of Sn Nanoparticles on SAC Solder Paste Preparation and IMC Growth on Cu Substrate: Evan Wernicki; Zhiyong Gu; University of Massachusetts Lowell 10:00 AM Break 10:20 AM Study of the Solid-state Diffusion of Bi in Sn – The Effects of Temperature, High Diffusivity Pathways, and Bi Concentration: Andre Delhaise; Zhangqi Chen; Doug Perovic; University of Toronto; Ohio State University 10:40 AM The Variation of Grain Structure and the Enhancement of Shear Strength in SAC305-0.1Ni/Cu and SAC1205-0.1Ni/Cu Solder Joint Before and After Aging: Collin Fleshman; Jenq-Gong Duh; National Tsing Hua University 11:00 AM Impression Creep of Sn-0.7Cu, Sn-3.8Ag, and Sn-3.8Ag-0.7Cu Lead-Free Solders: Seyed Alireza Torbati Sarraf; Reza Mahmudi; Abdol Reza Germmayeh; University of Southern California; University of Tehran; Islamic Azad University 11:20 AM Effects of Sb Additions on the Mechanical Behavior of SAC-Bi Solder Alloys: Mehran Malekian; Mert Çelik; Mat-tech; University College Dublin
CHARACTERIZATION

Advanced Real Time Imaging — Thermodynamic and Mechanical Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy; National Energy Technology Laboratory; F. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Tuesday AM | March 12, 2019
302B | Henry B. Gonzalez Convention Center

Session Chair: Zuotai Zhang, Southern University of Science And Technology

8:30 AM Invited
Surface Tension of High Temperature Liquids Evaluation with a Thermal Imaging Furnace: Andrew Caldwell; Mindy Wu; Antoine Alilare; Massachusetts Institute of Technology

9:00 AM Invited
Real-time Deformation Mechanisms of Advanced Nanocomposites by High-Resolution In-situ Testing: Arvind Agarwal; Pranjal Nautiyal; Florida International University

9:30 AM
Characterization of Localized Plastic Deformation Behaviors Associated with Dynamic Strain Aging In Pipeline Steels Using Digital Image Correlation: Taylor Jacobs; David Matlock; Kip Findley; Los Alamos National Laboratory; Colorado School of Mines

9:50 AM
New Laue Micro-diffraction Setup for Real Time In Situ Microstructural Characterization of Materials under External Stress: Dmitry Popov; Stas Sinogeikin; Changyong Park; Eric Rod; Jesse Smith; Rich Ferry; Curtis Kenney-Benson; Nenad Velisavjevic; Guoyin Shen; HPCAT; DAC Tools LLC; Los Alamos National Laboratory

10:10 AM Break

10:30 AM
Young Leaders International Scholar – JIM: An Approach for Solubility Measurement of SiC in Molten Silicon and Its Alloy by Real-time Interference Observation: Sakito Kawanishi; Takeshi Yoshikawa; Didier Chaussende; Hiroki Shibata; Tohoku University; The University of Tokyo; SIMaP

11:00 AM
In Situ Confocal Microscopy of P91 Steel under Short-term Creep in a High-temperature CO2 Environment: Kyle Rozman; Harrison Nealley; Jinichiro Nakano; Omer Dogan; Jeffrey Hawk; National Energy Technology Laboratory

MATERIALS PROCESSING

Advances in Surface Engineering — Session III

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Tuesday AM | March 12, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Tushar Borkar, Cleveland State University; Dong Lin. Kansas State University

8:30 AM
Effect of Zr Content on Structure Property Relations of Ni-Zr Alloy Thin Films Processed by dc Magnetron Co-sputtering: Bibhu Sahu; Rahul Mitra; Indian Institute of Technology, Kharagpur

8:50 AM
Effects of Process Parameters on the Zirconia Coating Prepared by Sol-gel and Electrodeposition Process: Jian Dong; Yanhui Sun; Bingsheng Dou; Feiyu He; Hongtao Huang; Jianping Zhen; University of Science and Technology Beijing; China Institute of Atomic Energy

9:10 AM
Optimization of Slurry Aluminized 31V Alloy Coatings: Beth Armstrong; Sebastien Dryeondt; Oak Ridge National Laboratory

9:30 AM
The Study of Slurry Erosion Wear Behavior of Coal Bottom Ash Slurry Handling Pipeline: Satish More; Sudeep Ingole; Dhananjay Bhatt; Jyoti Menghani; S V National Institute of Technology; Always Avant

9:50 AM Break

10:10 AM
Wear Characterization of Cemented Carbide Multipoint Cutting Tool Machining AISI 4140 at High Cutting Speed: Criteria for Materials Selection: Federico Gobber; Elisa Fracchia; Mario Rosso; Politecnico Di Torino

10:30 AM
Pulsed Potentiostatic Deposition of Cu-Zn Alloy Coatings from Novel Glycerol-NaOH Based Electrolyte for Wear Resistance and Anti-corrosive Properties: Sourav Das; Ssembadan Jena; Swastika Bhatia; Arijit Mitra; Siddhartha Das; Karabi Das; Indian Institute of Technology, Kharagpur

10:50 AM
Study of the Effects of Bi-Nano Additives on the Mechanical Properties of Asi 5130 Mild Steel during Machining: Adeniran Afolalu; Covenant University
Tuesday AM | March 12, 2019
304A | Henry B. Gonzalez Convention Center

**Session Chairs:** Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory

### Gluing Together Multiscale Computational and Experimental Information Sources with Machine Learning
**9:00 AM Invited**

By Maxwell Hutchinson;
 sesame 1; Citrine Informatics

**9:30 AM**

**Machine Learning of Phase-field Simulated Domain Structures of Ferroelectrics:**
Aapar Shankar; Surya Kalidindi;
Georgia Institute of Technology

**10:10 AM**

**Electron Microscopy Image Simulations for Phase Field and Discrete Dislocation Dynamics Defect Models:**
Marc De Graef;
Carnegie Mellon University

**10:40 AM**

**A Generalized Statistical Microstructure Generation Framework:**
Ahmet Cecen; Surya Kalidindi;
Georgia Institute of Technology

**11:10 AM**

**Accurate Reconstruction of Large EBSD Datasets by Multi-modal Data Approach and an Evolutionary Algorithm:**
Marie-Agathe Charpagnes; Florian Strub; Tresa Pollock;
University of California Santa Barbara; Université de Lille, CNRS, Centrale Lille, Inria

**11:40 AM**

**3D Microstructure Reconstruction Using Markov Random Fields: Validation of Microstructural Features:**
Iman Javaheri; Siddhartha Srivastava; Veera Sundararaghavan;
University of Michigan

### Electronic Materials

**Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session III**

**Sponsored by:** TMS: Alloy Phases Committee

**Program Organizers:**
Sinn-wen Chen, National Tsing Hua University; Albert T. Wu;
Hsien-Chien Hsieh;
National Central University

**8:30 AM Invited**

Development of Electroless Cobalt Diffusion Barrier for Medium-temperature Thermoelectric Module: Albert T. Wu;
Hsien-Chien Hsieh;
National Central University

**8:50 AM Invited**

The Role of Structure and Bonding on the Thermal Properties of Materials: George Nolas;
University of South Florida

**9:10 AM Invited**

Structure and Bonding in Phosphide Clathrate Thermoelectrics: Kirill Kovnir;
Iowa State University

**9:50 AM**

**Interfacial Stability of Co-P Diffusion Barrier for Bi2Te3 Thermoelectric Module:**
Chun Hsien Hsieh; Albert T. Wu;
National Central University

**10:30 AM Invited**

**Unprecedented Liquefaction Phenomena at Joints:**
Sinn-wen Chen;
Department of Chemical Engineering, National Tsing Hua University

**10:50 AM Invited**

**Alloying Effect and Defect Control for Boosting the Thermoelectric Performance of Mg-based Compounds:**
Weishu Liu;
Southern University of Science and Technology

**11:10 AM**

**Phase Diagrams of Thermoelectric Pb-Se-Sn-Te Quaternary System:**
Tsue-yang Huang; Sinn-wen Chen;
Department of Chemical Engineering, National Tsing Hua University
### LIGHT METALS
Aluminum Reduction Technology — Cell Design and Modelling

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizer:** Marc Dupuis, GeniSim Inc

**Tuesday AM | March 12, 2019**

**004 | Henry B. Gonzalez Convention Center**

**Session Chair:** Kristian Etienne Einarsrud, Norwegian University of Science and Technology (NTNU)

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#### 8:30 AM Introductory Comments

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#### 8:35 AM
A Transient Model of the Anodic Current Distribution in an Aluminum Electrolysis Cell: Sébastien Guérard; Patrice Côté; Rio Tinto

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#### 9:00 AM
A Numerical Study of Gas Production and Bubble Dynamics in a Hall-Héroult Reduction Cell: Alessandro Cubeddu; Varchavsi Nandana; Hendrik Gesell; Roman Gutt; Roman Düssel; Uwe Janoske; Bergische Universität Wuppertal; TRIMET Aluminium SE

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#### 9:25 AM
Thermoelectrical Design of Startup Fuses for Aluminum Reduction Cells: Andre Felipe Schneider; Donald Ziegler; Timothée Turcotte; Daniel Richard; Pascal Lavoie; Ryan Soncini; Jayson Tessier; Hatch; Alcoa Technical Center; Alcoa

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#### 9:50 AM
Modelling Study of Exhaust Rate Impact on Heat Loss from Aluminium Reduction Cells: Alexander Arkhipov; Ivgen Necheporenko; Alexander Mukhanov; Nadia Ahli; Khawla Almarzoqui; Emirates Global Aluminium

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#### 10:15 AM Break

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#### 10:30 AM
Finite Element Analysis of a Cylindrical Cathode Collector Bars Design: Olivier Lacroix; Richard Beeler; Hicham Chaouki; Louis Gosselin; Mario Fafard; Université Laval; Alcoa Technical Center

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#### 10:55 AM
CFD Modeling of Alumina Diffusion and Distribution in Aluminum Smelting Cells: Xiaozhen Liu; Youjian Yang; Zhaowen Wang; Wenju Tao; Tuofu Li; Zhibin Zhao; Northeastern University; Shenyang Aluminum & Magnesium Engineering and Research Institute Co. Ltd.

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#### 11:20 AM
Study on Side Ledge Behavior under Current Fluctuations Based on Coupled Thermo-electric Model: Hongliang Zhang; Qiyu Wang; Jie Li; Hui Guo; Jingkun Wang; Tianshuang Li; Central South University

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#### 11:45 AM Concluding Comments
CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials — Steels and Ni Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Tuesday AM | March 12, 2019
303A | Henry B. Gonzalez Convention Center

**Session Chairs:** Gregory Thompson, University of Alabama; Keith Knipling, Naval Research Laboratory

8:30 AM Invited
Application of Atom Probe Tomography to Fundamental Issues of Steel Materials: [Jun Tatara](#); Kazuto Kawakami; Yukiko Kobayashi; Kyohhee Ishikawa; Masaaki Fujioka; Naoyoshi Kubota;
1Nippon Steel & Sumitomo Metal Corporation; 2Nippon Steel & Sumikin Technology Corporation

9:05 AM
Atom Probe Analysis of Carbon and Nitrogen Redistribution during Heating of Soft Martensitic Stainless Steel: Frederic Danioxi; Frank Niessen; Matteo Villa; Daniel Apel; John Hald; Marcel Somers;
1Cnrs - Univesite De Normandie Rouen; 2Technical University of Denmark (DTU); 3Helmholtz-Zentrum fur Materialien und Energie (H2Z)

9:25 AM
Atom Probe Characterization of Nb-rich Nano-scale Precipitates in a High Strength Low Alloy Steel: Kelvin Xie; Andrew Breen; Julie Cairney; Simon Ringer; Texas A&M University; Max-Planck-Institut fur Eisenforschung; University of Sydney

9:45 AM
Distribution of Alloying Elements in Weathering Steels Induced by Oxide Layer Formation: Yidong Zang; ShenBao Jin; Xiaohong Guo; Gang Sha;
1Nanjing University Science and Technology; 2Angang Steel Company Limited

10:05 AM Break

10:25 AM
Atom Probe Investigation of Gamma Alpha Transformation Interfaces in a Model Fe-Mn-C Alloy: Olha Nakonechna; Mohamed Gouné; Helena Zapolsky; Didier Huin; Frederic Danioxi; UNIROUEN; CNRS ICMCB; ArcelorMittal; Cnrs - Universite De Normandie Rouen

10:45 AM Invited
Atom Probe Tomography Study of Trace Element Behavior and Secondary Phase Formation at Grain Boundaries of High Reflectivity Content Ni-based Superalloys: Stoichko Antonov; Wei Chen; Dieter Isheim; David Seidman; Qiang Feng; Eugene Sun; Sammy Tin; University of Science and Technology Beijing; Illinois Institute of Technology; Northwestern University; Rolls-Royce Corporation

11:20 AM
Thermal Evolution of Sputtered Nanostructured Mo-Au: Joel Bahena; J. Sebastian Riano; Mohammed Cheili; Torben Boll; Andrea Hodge; University of Southern California; Karlsruhe Institute of Technology

BIOLOGICAL MATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces III

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Tuesday AM | March 12, 2019
217C | Henry B. Gonzalez Convention Center

**Session Chairs:** Candan Tamerler, University of Kansas; Hannes Schniepp, College of William and Mary

8:30 AM
Self-assembling Peptides: Guiding Functional Precision at the Hybrid Interfaces: Candan Tamerler; 1University of Kansas

9:00 AM
A Portable Device for Point-of-need Production of Compartmentalised Micro/nanofibres for In Situ Drug Delivery: CJ Luo; 1University College London

9:20 AM Invited
A Biologically Inspired Attachable, Self-standing Nanofibrous Membrane for Versatile Use in Oil-water Separation or Antifouling: Seimei Shiratori; Keio University

9:50 AM
Predictive Modeling of Bionanomaterials from Picometers to Micrometers: Hendrik Heinz; 1University of Colorado Boulder

10:20 AM Break

10:40 AM Invited
Optimum Geometries in Biological and Bio-inspired Sutured Interfaces: Idris Malik; Mohammad Mirkhalaf; Francois Barthelat; McGill University

11:10 AM
Long Range Hierarchical Assembly of Pt Nanocubes — Insights from Measurements and Molecular Simulations of Nanoparticle Docking: Shiyi Wang; Enbo Zhu; Xucheng Yan; Masoud Sobani; Chen Wang; Yuan Liu; Xiangfeng Duan; Hendrik Heinz; Yu Huang; University of Colorado Boulder; University of California, Los Angeles; University of Akron

11:30 AM Invited
Spider Silk — A Hierarchical High-performance Material Based on Self-Assembly Starting at the Molecular Level: Qijue Wang; Hannes Schniepp; The College of William & Mary
BIOMATERIALS

Biological Materials Science — Biomimetic and Bioinspired Materials

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Tuesday AM | March 12, 2019
217A | Henry B. Gonzalez Convention Center

Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Steven Naleway, University of Utah

8:30 AM Invited Segmentation and Architecture in Natural Materials: Discrete Element Models for Bioinspiration: Francois Barthelat; 1McGill University

9:00 AM Bioinspired Phase Transforming Architectured Materials with Snap-through Instabilities: Yunlan Zhang; Kristiaan Hector; Mirian Velay; David Restrepo; Nilesh Mankame; Pablo Zavattieri; 1Purdue University; 2General Motors Research and Development

9:20 AM Bioinspired Segmented Armor: Discrete Element Models, 3D Printing and Mechanical Tests: Ali Shafei; J. William Pro; Francois Barthelat; 1McGill University; 2Mcgill University

9:40 AM Bioinspired Shark Teeth Serrated Edges for Penetration and Shearing: John Wood; M. Murphy; H. Rhee; A. McIntosh; M. Horstemeyer; R. Prabhu; 1Mississippi State University; 2Center for Advanced Vehicular Systems

10:00 AM Break

10:20 AM Bioinspired Microarchitected Materials by 3D Nanoparticle Printing: M. Sadeq Saleh; Chunshan Hu; Rahul Panat; 1Carnegie Mellon University; 2Washington State University

10:40 AM Invited Bioinspired, Graphene/Metal Composites with Exceptionally High Strength and Toughness: Yunya Zhang; Xiaodong Li; 1University of Virginia

11:00 AM Bio-inspired Design of Soft-hard Integrated Materials: Baoxing Xu; 1University of Virginia

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Alloy Development and Application

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Tuesday AM | March 12, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Liaw, The University of Tennessee; William Johnson, California Institute of Technology

8:30 AM Keynote Configurational Thermodynamics of Metallic Glasses: Can a Glass Melt?: William Johnson; 1California Institute of Technology; 2Glassimetal Technologies Inc.

9:00 AM Invited Fe-based Bulk Metallic Glasses: Properties and Phase Formation: Mihai Stoica; Jörg Löffler; 1ETH Zurich

9:20 AM Invited 3D Printing of Bulk Metallic Glasses: Is it a Rebirth or the End of BMG Research?: Douglas Hofmann; Punnathat Bordeenithikasem; Scott Roberts; Andre Pate; 1NASA JPL/Caltech

9:40 AM Invited Metallic-glass: A Beneficial Coating for Enhancing Electrospun Polyacrylonitrile Membrane for Oil/Water Separation: Shewaye Temesgen Kassa; Chien-Chieh Hu; Jee-Mun Chen; Jinn Chu; 1National Taiwan University of Science and Technology

10:00 AM Break

10:20 AM Invited Cold Spray Deposition of an Iron-based Bulk Metallic Glass: Constance Ziemian; Wendelin Wright; David Cipoletti; 1Bucknell University; 2Bucknell University; Hydro Flask

10:40 AM Invited Utilization of High Entropy Alloy Characteristics in Glass-forming Alloys: Jinyeon Kim; Hyun Seok Oh; Jinwoo Kim; Chae Woo Ryu; Geun Woo Lee; Hye Jung Chang; Eun Soo Park; 1Seoul National University; 2Korea Research Institute of Standards and Science; 3Korea Institute of Science and Technology

11:00 AM Invited Bulk Metallic Glass Inserts for Spacecraft Applications: Punnathat Bordeenithikasem; Robert Dillon; Douglas Hofmann; 1NASA JPL/Caltech

11:20 AM Invited Tailoring Phase Selection and Microstructure through Controlled Synthesis of Al-Sm Metallic Glasses: Fanqiang Meng; Yang Sun; Feng Zhang; Matthew Kramer; Ryan Ott; 1Ames Laboratory

11:40 AM Effective Way to Fabricate and Tailor Properties of a Laser-processed Bulk Metallic Glass: Geunhee Yoo; Tae Gyu Park; Jin Yeon Kim; H. Shin Cho; Hwi Jun Kim; Eun Soo Park; 1Seoul National University; 2Korea Institute of Industrial Technology
LIGHT METALS

Cast Shop Technology — Casting and Cast House Products

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Tuesday AM | March 12, 2019
007B | Henry B. Gonzalez Convention Center

Session Chair: Samuel Wagstaff, Novelis

8:30 AM Introductory Comments

8:35 AM
Macrosegregation Modelling of Large Sheet Ingots Including Grain Motion, Solidification Shrinkage and Mushy Zone Deformation. Dag Mortensen1, Øyvind Jensen1, Gerd-Ulrich Gruen2; Andreas Buchholz2; 1Institute For Energy Technology; 2Hydro Aluminium

9:00 AM
Effect of Reversing Rotational Magnetic Field on Grain Size Refinement. Akihiro Minagawa1; Koichi Takahashi2; Shin-ichi Shimasaki2; 1UACJ Corporation; 2Kagawa College

9:25 AM
A Reduction in Hot Cracking via Microstructural Modification in DC Cast Billets. Kathleen Bennett1; Elli Tindall1; Sam Wagstaff1; Kenzo Takahashi2; 1Novelis Inc; 2Zoom

9:50 AM
Analysis of the Interplay between Thermo-solutal Convection and Equiaxed Grain Motion in Relation to Macrosegregation Formation in AA5182 Sheet Ingots. Akash Paltanati1; Knut Omdal1; Tveito2; Mohammed M’Hamdi2; Hervé Combeau4; Miha Založnik1; 1Norwegian University of Science & Technology; 2Norway; 3Institut Jean Lamour; 4SINTEF Materials and Chemistry

10:15 AM Break

10:30 AM
Grain Refinement of Commercial EC Grade 1370 Aluminum Alloy for Electrical Applications. Massoud Hassanabadib; Shahid Akhtar1; Lars Arnborg1; Ragnhild E. Aune1; 1Norwegian University of Science and Technology (NTNU); 2Hydro Aluminium, Karmøy Primary Production, Haviøk

10:55 AM
Effects of CO2 Cover Gas and Yttrium Additions on the Oxidation of AlMg Alloys. Nicholas Smith1; Wissam Saidi1; Brian Gleeson1; Anne Kvithyld1; Gabriella Tranell1; 1Norwegian University of Science and Tech; 2University of Pittsburgh; 3SINTEF

11:20 AM
Behaviour of Aluminium Carbide in Al-melts during Re-melting. Morten Gøkelma1; Trygve Storm Aarnæs1; Jürgen Maier2; Bernd Friedrich1; Gabriella Tranell1; 1Norwegian University of Science and Technology; 2RWTH Aachen University

11:45 AM
Study of Controllable Inclusion Addition Methods in Al Melt. Jiawei Yang1; Sarina Bao2; Shahid Akhtar2; Yanjun Li1; 1Norwegian University of Science and Technology; 2SINTEF Industri; 3Norsk Hydro

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Environmental Degradation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Tuesday AM | March 12, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Xianming Bai, Virginia Tech; Izabela Szlufarska, University of Wisconsin

8:30 AM Invited
Computational Studies of Environmental Degradation of Silicon Carbide. Izabela Szlufarska1; Jianqi Xi1; Cheng Liu1; Dane Morgan1; 1University of Wisconsin

9:00 AM
Characterization of the Hydrothermal Corrosion Behavior of SiC With and Without Corrosion Mitigation Coatings. Peter Doyle1; Kurt Terrani2; Yutai Katoh2; Stephen Raiman3; Steven Zinkle3; 1University of Tennessee Knoxville; 2Oak Ridge National Laboratory

9:20 AM
Microstructural Effects on the High-temperature Oxidation Resistance of Magnetron Sputtered Cr-Al-Si-N Coatings on Zirconium Substrates. Han Zhu1; Yue Dong1; Fangfang Ge1; Feng Huang1; Jun Yu1; Ningbo Institute of Industrial Technology; 1Shanghai University

9:40 AM Invited
Nanostructured Ferritic Alloy-silicon Carbide Composites for Nuclear Applications. Kathy Lu1; Kastubh Bawane1; Kajije Ning1; 1Virginia Tech

10:10 AM Break

10:30 AM
Water Corrosion Resistance of Modified U3Si2. Lu Cai1; Ed Lahoda1; Frank Boylan1; Peng Xu1; Andrew Atwood1; Robert Oelrich1; Jie Lian1; 1Westinghouse Electric Company; 2Rensselaer Polytechnic Institute

10:50 AM
Characterization of U-Si Accident-tolerant Fuels Using Neutron Imaging and Diffraction. Sven Vogel1; Tashiema L. Wilson1; Adrian S. Losko1; Joshua T. White1; Kenneth J. McClellan1; 1Los Alamos National Laboratory; 2University of South Carolina
CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Metallurgical Process

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, Camento MATERIALS; Shadia Ikhnayes, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamitos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Díaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Tuesday AM | March 12, 2019
212B | Henry B. Gonzalez Convention Center

Session Chair: Y. Eren Kalay, Middle East Technical University

8:30 AM Introductory Comments

8:35 AM
Effect of Firing Temperature on Iron Ore Pellet Reduction Swelling with Different Silica Content: Gele Qing1; Qing Tian1; Xin Li1; Li Ma1; Wang Liu1; 1Shougang Group

8:55 AM
Effect of Metallic Iron Sinter Feed on Sinter Mineralogy and Quality: Mingming Zhang1; Marcelo Andrade1; 1ArcelorMittal Global R&D

9:15 AM
Effect of Microstructure on Resistance to Buildups Formation of Carbon Sleeves in Continuous Annealing Furnace for Silicon Steel Production: He Mingsheng1; Wangzhi Zhou1; Xuecheng Gong2; Jing Zhang2; Jian Xu2; 1R&D Center of Wuhan Iron & Steel Co., Ltd.; 2Silicon Steel Division of Wuhan Iron & Steel Co., Ltd.

9:35 AM
Influence of Cr2O3 and Basicity on Viscosity of Ti-bearing Blast Furnace Slag: Guibao Gu1; Jian Wang1; Shiyuan Liu1; Qinglei Li1; 1Chongqing University

9:55 AM
Raman Spectroscopy on the KBF4-MgO-KCl Molten Salt System: Xianwei Hu1; Bo Li1; Jiangyu Yu1; Zhongqing Shi1; Bingliang Gao1; Zhaowen Wang1; 1Northeastern University

10:15 AM Break

10:30 AM
Influence of Water Vapor on the Oxidation Behavior of a Hot Working Tool Steel for Applications in Roughing Mill Work Rolls: Kai Fota2; Andreas Cestonaro2; Peter Heisterkamp2; Hartmut Jacke2; Frieder Spannagel2; Bronislava Gorr1; Hans-Jürgen Christ1; 1Universität Siegen; 2Gontermann-Beipers GmbH

10:50 AM
Thermodynamic Characteristics of Ferronickel Slag Sintered in the Presence of Magnesia: Fongquan Gu1; Zhiwei Peng1; Yuanbo Zhang1; Huimin Tang1; Lei Ye1; Weiguang Tian1; Guoshen Liang1; Joonho Lee1; Mingjun Li1; Guanghui Li1; Tao Jiang1; 1Central South University; 2Guangdong Guangqing Metal Technology Co. Ltd.; 3Korea University

11:10 AM
Characterization on the Properties of Calcium Stannates Synthesized under Different Atmospheres: Bentai Han1; Zijian Su1; Yuanbo Zhang1; Bingbing Liu1; Manman Lu1; Tao Jiang1; 1Central South University

CORROSION

Coatings and Surface Engineering for Environmental Protection — Coatings for Corrosion Protection I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarak, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Tuesday AM | March 12, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Brian Okerberg, PPG; Raul Rebak, GE Global Research

8:30 AM Invited
Improvement of the High Temperature Oxidation Behavior of Ni-alloys by a Combined Al- Plus F-treatment: Alexander Donchev1; Ali Soleiman1; Mathias Galetz2; 1DEHEMA-Forschungsinstitut

9:10 AM
Comparing the Corrosion Resistance Imparted by a Polyetherimide Coating on Magnesium and Steel: Holly Martin1; 1Youngstown State University

9:30 AM Invited
Protective Coating for Nuclear Fuel Claddings: Kiran Nimishakavi1; Jeremy Bischoff1; John Strumpell1; 1Framatome Inc.

10:10 AM Break

10:30 AM
Effect and Role of Alloyed Nb on the Air Oxidation Behaviour of Ni-Cr-Fe Alloys at 1000 °C: Yaxin Xu1; Wenyi Li1; 1Northwestern Polytechnical University

10:50 AM
Effect of Nickel Content on Mechanical Property and Corrosion Behaviour of Nickel-aluminium Bronze: Fenfen Yang1; Tongmin Wang1; Enyu Guo1; Huijun Kang1; Zongning Chen1; 1Dalian University of Technology

11:10 AM
Corrosion Phenomena in Powder-processed Icosahedral-phase-strengthened Aluminuim Alloys: Sarshad Rommel1; Hannah Leonard1; Thomas Watson2; Sonia Tulyani2; Mark Aindow2; 1University of Connecticut; 2Pratt & Whitney; 3UTC Aerospace Systems

11:30 AM
Corrosion Properties of Steel Sheet with Zinc-base Alloyed Coatings: Guangrui Jiang1; Ting Shang1; 1Shougang
MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — AI-based Investigation of Material Properties I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

Tuesday AM | March 12, 2019
305 | Henry B. Gonzalez Convention Center

Session Chair: Adrian Sabau, Oak Ridge National Laboratory

8:30 AM
Applying Machine Learning Techniques to Predict Precipitate Morphology for Alloy Design and Uncertainty Quantification:
Stephen DeWitt1; Brian Puchala1; Katsuyo Thornton1; John Allison1; 1University of Michigan

8:50 AM
Machine Learning to Predict Continuous Cooling Phase Transformations in Steels: Peter Hedström1; Moshiour Rahaman2; Wangzhong Mu1; Joakim Odqvist1; 1KTH Royal Institute of Technology; 2HiMat Engineering

9:10 AM Invited
Machine Learning for High-Temperature Alloy Design: High-Quality Data, Scientific Descriptors and Curve Fitting: Dongwon Shin1; Bruce Pint1; Govindarajan Muralidharan1; Yukinori Yamamoto1; Michael Brady1; Jiheon Jun1; Sangkeun Lee1; J. Haynes1; 1Oak Ridge National Laboratory

9:40 AM
Optimization of Calibration Methods for a Reduced-order Structure Property Linkage of Polycrystalline Materials:
Aaron Tallman1; Krzysztof Stopka1; Laura Swiler2; Yan Wang3; Surya Kalidindi4; David McDowell5; 1Georgia Institute of Technology; 2Sandia National Laboratories

10:00 AM Break

10:20 AM Invited
A Machine Learning Exploration of Grain Boundary Mobility Mechanisms: Srikanth Patala1; 1North Carolina State University

10:50 AM
Steel Inclusion Classification Using Computer Vision and Machine Learning: Nan Gao1; Mohammad Abdulsalam1; Bryan Webler2; Elizabeth Holm1; 1Carnegie Mellon University, Materials Science and Engineering

11:10 AM
A Reification Approach to Modeling Material Response by Fitting Johnson Cook Parameters:
Jaylen James1; Austin Gerlt2; Manny Gonzales3; Eric Payton2; Reji John2; Ibrahim Karaman1; Raymundo Arroyave1; Douglas Allaire1; 1Texas A&M University; 2Air Force Research Laboratory

11:30 AM
Automatminer: An Automatic Materials Science Machine Learning Tool for Benchmarking and Prediction:
Alexander Dunn1; Alireza Faghaninia2; Qi Wang3; Anubhav Jain4; Alex Ganose5; 1University of California, Berkeley; 2Lawrence Berkeley Laboratory

(Program continues on next page)
MATERIALS DESIGN

Computational Materials Discovery and Design — Applications for Defects and the Bulk II

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

Tuesday AM | March 12, 2019
304C | Henry B. Gonzalez Convention Center

Session Chairs: James Rondinelli, Northwestern University; Arunima Singh, Arizona State University

8:30 AM Invited
Machine Learning Guided Accelerated Search for New Materials with Experimental Data: Prosanna Balachandran1; 1University of Virginia

8:50 AM
Structure and Properties of High-mobility MoTe2 Phases: Arunima Singh1; Ryan Beams2; Irina Kalish3; Sergiy Krylyuk4; Albert Davydov1; 1Arizona State University; 2Food and Drug Administration; 3National Institute of Standards and Technology; 4Theiss Research

9:10 AM
eXtremeMAT: Computational Materials Discovery for Existing and Advanced FE Power Cycles: Jeffrey Hawk1; David Alman1; 1National Energy Technology Laboratory, U.S. Department of Energy

9:30 AM
Machine-learning Phase Prediction of High-entropy Alloys: Wenjiang Huang1; Pedro Martin2; Houlong Zhuang3; 1Arizona State University

9:50 AM Break

10:10 AM
Machine Learned Defect Level Prediction for Lead-based Hybrid Perovskites: Arun Kumar Mannodi Kanakkithodi1; Maria Chan2; Michael Davis3; 1Argonne National Laboratory

10:30 AM
Prediction of the Strength of FeNiCrCo High Entropy Alloy Single Crystals: Mohammad Asadilhia1; Vadym Drozd2; Yu Zhong1; 1Worcester Polytechnic Institute; 2Florida International University

10:50 AM
Presence of Chern Insulating and Weyl Semimetallic Phase in Bi2MnSe4/Bi2Se3 Multilayer Heterostructures: Sugata Chowdhury1; Kevin Garrity2; Joseph Hagmann3; Curt Richter1; Francesca Tavazza4; 1National Institute of Standards and Technology

11:10 AM
Density Functional Theory Study on the Complexation of La (III) Ion with Hydroxyamide Ligands: Anindita Pati1; Tarun Kundu2; Snehashu Pat3; 1IIIT Kharagpur; 2National Institute of Technology, Rourkela; 3National Institute of Technology, Rourkela

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Kinetics

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Tuesday AM | March 12, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Hesam Askari, University of Rochester; Marius Stan, Argonne National Laboratory

8:30 AM Invited
Phase-field Model of Oxidation: Kinetics: Kyungdon Kim1; Quentin Sherman2; Larry Aagesen3; Peter W. Voorhees4; 1Northwestern University; 2Idaho National Laboratory

9:00 AM
Hydrogen Diffusion in HCP Iron: A First-principles Study: Satoshi Ilibuob1; Kenji Hirata1; Yui Kuroki1; Shoya Kawano1; Hiroshi Ohtani1; Morimichi Koyama1; Kanaeki Tsuzaki1; Kyushu Institute Of Technology; 2Tohoku University; 3Kyushu University

9:20 AM
Simulated Hydrogen Diffusion in Nickel Grain Boundaries: David Page1; Eric Homer2; Katie Varela2; Oliver Johnson3; David Fullwood1; 1Brigham Young University

9:40 AM
First-principles Kinetic Monte Carlo Study of Temperature Effects on Pipe Diffusion in FCC Ni: Luke Wirth1; Amir Farajian2; Christopher Woodward1; 1Wright State University; 2Air Force Research Laboratory

10:00 AM Break

10:20 AM
Phosphorus Effect on Vacancy-mediated Diffusion and Ordering Kinetics in Nickel Alloys: Jia-Hong Ke1; George A. Young2; Julie D. Tucker1; 1Oregon State University; 2Dominion Engineering, Inc.

10:40 AM
First-principles Calculations of Factors Contributing to Non-dilute Impurity Diffusion Coefficients in Metals: Chelsey Hargather1; Harrison Lee1; John O’Connell1; ShunLi Shang1; Zi-Kui Liu1; 1New Mexico Institute of Mining and Technology

11:00 AM
Oxygen Diffusion in Zirconia with Kinetic Monte Carlo: Thomas Schabitzki1; Ying Chen1; Tetsuo Mohri2; 1Institute for Materials Research, Tohoku University; 2Graduate School of Engineering, Tohoku University

11:20 AM
Kinetics Calculation and Analysis of AlN Precipitation in ML40Cr Steel Austenite: Ziyi Liu1; Yanping Bao1; Min Wang1; 1University of Science and Technology Beijing
MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Superalloys: Alloy Development and Fatigue

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cornier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detroit, National Energy Technology Laboratory

Tuesday AM | March 12, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Sammy Tin, Illinois Institute of Technology; Martin Detroit, National Energy Technology Laboratory

8:30 AM Invited
Developing Alloy Compositions for Future High Temperature Disk Rotors: Mark Hardy1; Katerina Christofidou2; Christos Argyramidis2; Suyang Yu1; Hang-yue Li1; Alison Wilson1; Catherine Rae2; Paul Bowen2; Howard Stone2.

9:00 AM
Effect of Grain Boundary Serration on Creep Enhancement in a Nickel Alloy Inconel 600: Yuanbo Tang1; Angus Wilkinson1; Roger Reed3.

9:20 AM
Stress Analysis and Structure Optimization of W-shaped Radiant Tube in Continuous Annealing Furnace: Yanglong Li2; Shunning Liu2; Dawei Hou2; Wei Guo2; Hui Wang2; Meng Yu3.

9:40 AM
On the Rapid Assessment of Mechanical Behaviour of a Prototype Nickel-Based Superalloy using Small-Scale Testing: Sabin Sulzer1; Enrique Alabort1; André Németh1; Roger Reed3.

10:00 AM
Break

10:20 AM Invited
A Fatigue Deformation Map to Quantify the Degree of Mesoscopic Cube Slip at Elevated Temperatures: Alberto Mello1; Andrea Nicolas1; Michael Sangid2.

10:50 AM
Low Cycle Fatigue Performance of HAYNES 244 Alloy: Michael Fahrmann1; Haynes International

11:10 AM
Fatigue and Creep Life Sensitivity to Processing Defects of a Third Generation Ni-based Single Crystal Superalloy: Luciana Maria Bartoluci Omastroni1; Lorena Mataveli Suave2; Jonathan Cornier1; 1Institut Pprime/ISAE-ENSMA; 2SAFRAN Tech

11:30 AM
Microstructure and Mechanical Behavior of MarM-509 Fabricated by Direct Metal Laser Sintering: Nicholas Ferren1; Saeede Ghorbanpour1; Jonathan Bicknell2; Marko Knezevic2; 1University of New Hampshire; 2Turbocam International

LIGHT METALS

Electrode Technology for Aluminum Production — Electrodes - Baking

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Tuesday AM | March 12, 2019
006D | Henry B. Gonzalez Convention Center

Session Chairs: Frank Hiltmann, COBEX GmbH; Jianhong Yang.

8:30 AM Introductory Comments

8:35 AM
Development of a New Baking Furnace Design Concept without Headwall to Increase Anode Production Capacity: Arnaud Bourgier1; Lise Lavigne1; Yves Tremblay2; Allan Graham3; Meaghan Noonan3; 1Rio Tinto Aluminium; 2Pacific Aluminium

9:00 AM
Risk Assessment of Fire & Explosion Incident in Anode Baking Furnace and Operational Practices: Suryanta Nayak1; Kalpataru Samal2; Pulak Patra2; 1Hindalco Industries Ltd.

9:25 AM
The Optimization of Soaking Time to Reduce Fuel Consumption while Keeping Good Baked Anode Quality: S.S. Sijabat1; Ivan Ermisyan2; Firman Ashad2; Ivan Yudho2; Daniel Hutahuruk2; Ade Buandra2; 1Pt Indonesia Asahan Aluminium (Persero)

9:50 AM
Influence of Coke Calcining Level on Anode Real Density, Lc and Other Properties Using a Constant Baking Cycle: Christopher Kühn1; Les Edwards2; Marvin Lubin3; Kevin Harp4; 1Rutgers Germany GmbH; 2Rain Carbon, Inc.

10:15 AM
Break

10:30 AM
In Situ Monitoring of Pit Gas Composition during Baking of Anodes for Aluminium Electrolysis: Trond Brandvik1; Thor Andreas Aarhaug1; Heiko Gaertner2; Arne Petter Ratvik3; Tor Grande4; 1NTNU Norwegian University of Science and Technology; 2SINTEF Industry

10:55 AM
Measurement of Anode Anisotropy by Micro X-ray Computed Tomography: Stein Rørvik1; Lorentz Lossius2; Dag Herman Andersen3; 1SINTEF Group; 2Hydro Aluminium

11:20 AM
Experimental Study on Preparation of Prebake Anodes with High Sulfur Petroleum Coke Desulfurized at High Temperatures: Shouei Gao1; 1Sunstone Development

11:45 AM
Electrochemical Behaviour of Carbon Anodes Produced with Different Mixing Temperatures and Baking Levels — A Laboratory Study: Camilla Sommerseeth; Rebecca Thorne; Wojciech Gebarowski1; Arne Ratvik2; Stein Rørvik1; Hogne Linga1; Lorentz Lossius3; Ann Svensson4; 1SINTEF Industry; 2Norwegian Institute for Air Research; 3AGH University of Science and Technology; 4Sintef Industry; 1Hydro Aluminium AS; 2Norwegian University of Science and Technology

Hydrogen Assisted Fracture in Austenitic Stainless Steel Welds: Explained: Kaila Bertsch; Kelly Nygren; Shuai Wang; Akhide Nagaoo; Hongbin Bi; Ian Robertson; University of Wisconsin, Madison; *Southern University of Science and Technology; JFE Steel; Oak Ridge National Laboratory

Evolution of Dislocation Structure in the Presence of Hydrogen: Shuai Wang; Akhide Nagaoo; Kaveh Edalati; Zenji Horita; Petros Sofronis; Ian Robertson; University of Wisconsin and Technology; JFE Steel Corporation; Kyushu University; University of Illinois at Urbana-Champaign; University of Wisconsin, Madison

On the Trail of the Hydrogen Embrittlement by Novel Critical Experiments: Afroz Barnoush; Norwegian University of Science and Technology

Hydrogen Assisted Fracture in Austenitic Stainless Steel Welds: Joseph Ronevich; Chris San Marchi; Josh Sugar; Dorian Balch; Sandia National Laboratories

Mechanistic Framework for Fatigue Crack Growth in the Presence of Hydrogen: Seyyedehzahra Hosseinisrani; Mohsen Dadfarfania; Masanobu Kubota; Akhide Nagaoo; Brian Somerday; Petros Sofronis; Robert Ritchie; University of Illinois at Urbana-Champaign; Kyushu University; JFE Steel Corporation; Southwest Research Institute; University of California, Berkeley

A Mechanistic Modelling Framework for Hydrogen Assisted Cracking: Emilio Martinez-Paredes; University of Cambridge

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Relationships Among Processing, Microstructure, and Fatigue Properties

Fatigue and Fracture Behavior of Gamma Titanium Aluminide Ti-43.5Al-4Nb-1Mo-0.1B (TNM): Hannah Sims; Matthew Dahar; Sesh Tamirisakandala; John Lewandowski; Case Western Reserve University; Arconic

Simulation of Extrusion Growth and Microcrack Initiation for Type A and B Persistent Slip Bands: Eyouléléhi Aiwi; Maxime Sauxsay; J. Hazan; CEA & Université Paris Sorbonne; CEA

Microstructure and Local Fatigue Property Assessment near Linear Friction Welds: Christopher Magazzini; Jicheng Gong; Angus Wilkinson; University of Oxford

On the Evolution of Crack-tip y' Precipitation at 750\degree C in the New Nickel-based Superalloy AD730\textsuperscript{8482}: Nicolas Mrozowski; Guilhuame Benoit; Florence Hamon; Jonathan Cormier; Jean-Michel Franchet; Anne-Laure Roufflé; Gilbert Hénaff; Patrick Villechaise; Safran TECH - Institut Pprime; ISAE ENSMA - Institut Pprime; CNRS - Institut Pprime; SAFRAN Tech

Effect of Local Texture on Heterogeneous Plastic Strain Fields during Low Cycle Fatigue in Ni-based Superalloys using Crystal Plasticity Finite Element Simulations: Jean-Briac le Graverend; Texas A&M University

Various Factors Affecting Fatigue Behaviors of TWIP Steels: Hyohyoung Sung; Soojin Ahn; Kwanho Lee; Woonin An; Sangshik Kim; Jeyhun Lee; Gyeongsang National University; Gyeongsang National University; Changwon National University

Role of Surface Roughness on Fatigue Crack Initiation on Surface: Calvin Tszeng; Santa Clara University
MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Alloy Development & Microstructural Evolution

**Sponsored by:** TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

Tuesday AM | March 12, 2019
206A | Henry B. Gonzalez Convention Center

**Session Chairs:** David Dye, Imperial College London; Katelun Wertz, Air Force Research Laboratory

8:30 AM Invited
Microstructural and Compositional Design of Multicomponent Co/Ni-based Superalloys using High-throughput Diffusion Multiples: Wendao Li; Changdong Wei; Longfei Li; Ji-Cheng Zhao; Qiang Feng; 1University of Science and Technology Beijing; 2The Ohio State University

9:00 AM Invited
Elemental Partitioning and Site-occupancy Behavior of Alloying Elements in 1/3- and 1/2-Strengthened Co-Ti based Alloys: Pyuch-Pa Cho; Hyeji Im; Boryung Yoo; Surendra Makineni; Baptiste Gault; Dierk Raabe; 1Korea Advanced Institute of Science and Technology; 2Max-Planck-Institut fuer Eisenforschung

9:30 AM
Partitioning Preferences of Alloying Elements and their Effect on the Stability of the 1/3-L12-phase in Co-base Superalloys: Li Wang; Yuzhi Li; Michael Oehringer; Uwe Lorenz; Florian Pyczak; Helmholtz-Zentrum Geesthacht; Northwestern Polytechnical University

9:50 AM
1/3 and 1/2 Microstructures in W-free Co-Ta-V- and Co-Nb-V-based Systems: Fernando Reyes Tirado; David Dunand; Northwestern University

10:10 AM Break

10:30 AM Invited
Development of Ni/Co Based Superalloys: CALPHAD and Materials Databases: Suzana Fries; Ruhr University Bochum

11:00 AM
Towards Developing a New Generation of Cobalt Based Superalloys: Komanio Chattopadhyay; Prafull Pandey; Indian Institute of Science

11:20 AM
The Effect of Long Term Exposure at Elevated Temperature on the Stability of a Novel Co-Ni Based Superalloy: Ning Zhou; Alberto Polar Rosas; Gian Colombi; Tao Wang; Stéphane Forsik; Samuel Kernion; Mario Eppler; Cartech

11:40 AM
A Rapid and Simplified Approach to Accurately Measure Single Crystal Elastic Constants: Brent Goodlet; Ben Bales; Leah Mills; Marie-Agathe Charpagné; Sean Murray; Linda Petzoldt; Tresa Pollock; University of California, Santa Barbara

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Nano and Micro Green Composites

**Sponsored by:** TMS: Materials Characterization Committee

**Program Organizers:** Shadad Ikhnayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Tuesday AM | March 12, 2019
008A | Henry B. Gonzalez Convention Center

**Session Chairs:** Esperidiana Moura, Nuclear & Energy Research Institute; Afonso Azevedo, Instituto Federal Fluminense

8:30 AM Introductory Comments

8:35 AM Keynote
Application of Natural Nanoparticle in Polymeric Blend of HMSPP/SEBS for Biocide Activity: Luiz Komatsu; Angelica Zafalon; Vinicius Santos; Nilton Lincopan; Vijaya Rangari; Ducleur Parra; Nuclear and Energy Research Institute; Institute of Biomedical Sciences; Tuskegee University

9:15 AM
The Potential of Micro- and Nano-sized Fillers Extracted from Agroindustry Residues as Reinforcements of Thermoplastic-based Biocomposites - A Review: Esperidiana Moura; Nuclear & Energy Research Institute

9:35 AM
Thermal Characterization of a Nanobiocomposite for Use in Bone Defects: Teresa Castillo; Leila Siqueira; Ruben Jesus Sanchez Rodriguez; State University of Northern Rio de Janeiro

9:55 AM Break

10:05 AM
3D Printing of Live Diatoms to Make Structures with Many Levels of Hierarchy: John Gardner; Ben Lazarus; Hannes Schniepp; NASA Langley Research Center; College of William & Mary

10:25 AM
Impact Properties of Composites Reinforced by Bamboo Fibers with Polyurethane and Epoxy as Matrix: Mariana Lopes; Juliana Carvalho; Felipe Lopes; Sérgio Monteiro; Carlos Vieira; State University of Northern Rio de Janeiro

10:45 AM
Thermal Behavior of Epoxy Composites Reinforced with Fique Fabric by DSC: Michelle Oliveira; Artur Camposo; Sérgio Monteiro; Fabio Garcia; Luana Demosthenes; Military Institute of Engineering

11:05 AM
Chemical and Morphological Characterization of Guaruman Fiber: Raphael Reis; Larissa Nunes; Verônica Cândido; Sergio Monteiro; IME; Federal University of Pará – UFPA
MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Gradient Materials I: Mechanical Properties

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Tuesday AM | March 12, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Ke Lu, Chinese Academy of Sciences; David Field, Washington State University; Xinghang Zhang, Purdue University; Hatem Zurob, McMaster University

8:30 AM Invited
Strengthening and Work Hardening in Gradient Nanotwinned Metals: Lei Lu1; 1Institute of Metal Research, CAS

8:55 AM
Mechanical Behavior of Structurally Gradient Nickel Alloys: Xinghang Zhang1; Jie Ding1; Jiang Li2; 1Purdue University

9:15 AM Invited
The Design of High Strength, Ductility, and Impact Resistance of Compositionally and Microstructurally Graded Steel: Bosco Yu1; Hamid Azizd1; David Embury1; Hatem Zurob2; 1McMaster University

9:40 AM
Enhanced Fatigue Strength and Lifetime in an Austenitic Stainless Steel with a Gradient Nanostructured Surface Layer: Y.B. Lei1; Z.B. Wang1; K. Lu2; 1Institute of Metal Research, CAS

10:00 AM Break

10:20 AM Invited
Microstructure and Mechanical Properties of Nano-Al and Mg Alloys and Composites with Heterogeneous and Gradient Structures: Baolong Zheng1; Xin Wang2; Yuntian Zhu2; Julie Schoenung3; Enrique Lavermia; 1University of California, Irvine; 2North Carolina State University

10:45 AM
Gradient Microstructure and Mechanical Properties of a TiAl Alloy after High-temperature Torsion: Yongfeng Liang1; Jie Ding1; Jianping He2; Junpin Lin2; 1University of Science and Technology Beijing

11:05 AM
Effect of Gradient Microstructures on Strength and Ductility of TRC AZ31: Maryam Jamalian1; David Field2; 1Washington State University

11:25 AM Invited
Gradient Grained Nickel with Optimum Gradient on Mechanical Properties: Li Yi1; 1Institute of Metal Research, CAS

11:50 AM
Formation of Hard Intermetallic Phases in Zn-Mg Hybrids Processed by High-pressure Torsion: David Hernández Escobar1; Hakan Yilmazer1; Megumi Kawasaki1; Carl Boehlert2; 1Michigan State University; 2Yildiz Technical University; 3Oregon State University

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Tuesday AM | March 12, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Easo George, Oak Ridge National Laboratory; E-Wen Huang, National Chiao Tung University

8:30 AM Keynote
Phase Instability and Mechanical Properties of the CrMnFeCoNi High-entropy Alloy: F. Fox1; Y. Kalchev2; S. Berglund3; A. Kostka2; G. Laplanch3; G. Eggeler4; Easo George5; 1Ruhr University Bochum; 2Oak Ridge National Laboratory

9:00 AM Invited
Crystallographic Slip in a High-entropy Alloy: Quentin Rizzardi1; Gregory Sparks2; Robert Maoz3; 1University of Illinois at Urbana-Champaign

9:20 AM Invited
Nanomechanical Studies of High-entropy Alloys: Yu Zou1; 1University of Toronto

9:40 AM
Microstructural Evolution and Influence of Grain Size on the Mechanical Properties of AlCoCrFeNi Single Phase High Entropy Alloy: Srinivas Duda1; Chenna Krishna S2; Rajesh Korda3; 1Indian Institute of Technology, Hyderabad; 2Vikram Sarabhai Space Centre, Trivandrum

10:00 AM Break

10:20 AM Invited
Balance of Strength-ductility in Ultrafine-grained (CoCrMnNi)Fe2, Medium Entropy Alloy Having Fully Recrystallized Microstructure: Ibrahim Onidio1; Nokeun Park2; 1Yeungnam University

10:40 AM
Lattice Distortion and Its Effect on Mechanical Behavior in Single-phase Nb-Ta-Ti-V-Zr Refractory High-entropy Alloy Systems: Chanso Lee1; Gian Song2; Wei Chen2; Michael Gao3; Yi Chou4; Yi-Chia Chou5; Jamieson Brechtl6; Hahn Choo1; Peter Liaw2; 1The University of Tennessee; 2Kongju National University; 3Illinois Institute of Technology; 4National Energy Technology Laboratory; 5EACOM; 6National Chiao Tung University

11:00 AM Invited
Recent Progresses in the Understanding of Metastable High-entropy Alloys: Zhiming Li1; Jing Su2; Wenjun Lu3; Hong Luo2; Zhangwei Wang1; Xiaoxiang Wu2; Dierk Raabe4; 1Max-Planck-Institut Fur Eisenforschung

11:20 AM
Advanced Manufacturing of High Entropy Alloys: Andrew Kustas1; Shaun Whetten1; Dave Keicher1; Jake Mahaffey2; Andrew Vackel1; Dinakar Sagapurnam2; Joseph Michael2; Michael Chodross3; Ping Lu4; Nicolas Argibay5; 1Sandia National Laboratories; 2Texas A&M University
11:40 AM
Hydrogen Embrittlement and Diffusion Behavior of High Entropy Alloy (Co0.2Cr0.2Fe0.2Mn0.2Ni0.2): Junghoon Lee1; Cheolho Park2; Namhyun Kang3; Kyungmok Cho4; Youngsang Na5; Hyoungseop Kim6; 1Pusan National University; 2Korea Institute of Materials Science; 3Pohang University of Science and Technology

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment — Materials Design and Discovery I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory; Jeremy Whitney, United Technologies Research; Kenneth Vecchio, Duke University; Collin Holgate, University of Minnesota; Wesley Jackson, 1University of California Santa Barbara; 2University of Minnesota; 1United Technologies Research Center; 3University of Pittsburgh; 1Institute of Micro- and Nanostructure Research; 1Oak Ridge National Laboratory; 2University of Tennessee

Tuesday AM | March 12, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

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8:30 AM Invited
Beyond Cluster Expansion: New Approaches for Alloys: Gus Hart1; 1Brigham Young University

9:00 AM Invited
The Materials Project for Computational Materials Design: Kristin Persson1; 1University of California, Berkeley

9:30 AM Invited
High Entropy Alloys from High Throughput Calculations: Understanding Material-specific Variations from Hume-Rothery Rules: James Morris1; Louis Santodonato1; M. Claudia Troparevsky1; Ray Unocic1; Hongbin Bei2; Peter Liaw2; 1Oak Ridge National Laboratory; 2University of Tennessee

10:00 AM Break

10:20 AM Invited
The Search for High Entropy Alloys: A High-throughput Ab-initio Approach: Stefano Curtarolo1; Yoav Lederer2; Cormac Toher3; Kenneth Vecchio4; 1Duke University; 2NRCN; 3University of California, San Diego

10:50 AM Invited
Inverse Band Structure Design via Materials Informatics: Eric Isaacs1; Christopher Wolverton2; 1Northwestern University

11:20 AM Invited
Implementation of the ICME Approach in a Master Course in Materials Science and Simulations: Suzana Fries1; 1Ruhr University Bochum

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MATERIALS DESIGN

ICME Case Studies and Validation: Extreme Environments — Session I


Program Organizers: James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwons Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Tuesday AM | March 12, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Xuan Liu, Pratt & Whitney

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8:30 AM Invited
Case Study in ICME Guided Materials Development: Jerry Gibbs1; 1US Department Of Energy

9:10 AM Invited
An Integrated Approach to Assess the CMAS Performance of T/EBCs: Carlos Levi1; David Poerschke2; Collin Holgate3; William Summers4; Wesley Jackson5; 1University of California Santa Barbara; 2University of Minnesota; 3United Technologies Research Center

9:50 AM
Integrated Numerical Modeling of Misoriented Grains in Directionally-solidified Ni-base Superalloy Castings and Its Application to Turbine Blades: Huijuan Dai1; Durga Ananthanarayanan2; Lang Yuan2; Shenyang Huang1; Jared Iverson1; Patrick Willson1; Mark Thompson1; 1GE Global Research

10:10 AM Break

10:30 AM Invited
ICME Approaches to Alloy Design for High-temperature Corrosion Resistance: Brian Gleeson1; 1University of Pittsburgh

11:10 AM
Systematic Analysis of the y/y’-micro- and Nanostructure Evolution with Increasing Temperature Exploiting a New Rapid Thermal Annealing Furnace Approach: Dorota Kubacka1; Yolita Eggeler1; Erdmann Spiecker1; 1Institute of Micro- and Nanostructure Research

11:30 AM
In Situ TEM Heating Experiments to Assess Chemical Evolution at Interfaces of - Strengthened Superalloys at High Temperatures: Yolita Eggeler1; Erdmann Spiecker1; 1University Erlangen-Nuernberg
CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Microstructural Evolution I

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Tuesday AM | March 12, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Mark Asta, University of California, Berkeley; Jessica Krogstad, University of Illinois at Urbana-Champaign

8:30 AM Invited
Mobility of Stacking-order Domain Boundaries in Bilayer Graphene: David Olmsted; Max Poschmann; Mark Asta; 1University Of California, Berkeley

9:00 AM
Stress Modulated Grain Boundary Mobility: Derek Lontine; Oliver Johnson; 2US Synthetic; 3Brigham Young University

9:20 AM
The Wide World of Grain Boundary Mode Selection: Ian Chesser; Brandon Runnels; Elizabeth Holm; 1Carnegie Mellon University; 2University of Colorado Colorado Springs

9:40 AM Invited
The How and Why of GB Dynamics: David Srolovitz; Jian Han; 1University of Hong Kong; University of Pennsylvania; 2University of Pennsylvania

10:10 AM Break

10:30 AM
Twin Boundary Facets in Three-dimensions: Shujuan Wang; Rodney McCabe; Laurent Capolungo; 1Los Alamos National Laboratory

10:50 AM
The Role of the Interface Stiffness Tensor on Grain Boundary Dynamics: Fadi Abdeljawad; Stephen Foiles; Adam Hinkle; Alex Moore; Christopher Barr; Nathan Heckman; Khalid Hattar; Brad Boyce; 1Sandia National Laboratories

11:10 AM Invited
Measurements of Grain Boundary Energies and Curvatures in Polycrystalline Materials and their Influence on Microstructural Evolution: Gregory Rohrer; 1Carnegie Mellon University

11:40 AM Invited
Interface Formation and Adhesion under In-Situ Transmission Electron Microscope: Scott Mao; Yang He; Chongmin Wang; 1University of Pittsburgh; 2Pacific Northwest National Laboratory

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Nanoprecipitates and Nanoclusters

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Tuesday AM | March 12, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Eda Aydogan, Los Alamos National Laboratory; Janelle Wharry, Purdue University

8:30 AM Invited
Evolution of Stresses and Strains in Nuclear Reactor Components: Sergei Dudarev; Daniel Mason; Edmund Tarleton; Pui-Wai Ma; Andrea Sand; 1University of Oxford; 2University of Helsinki

9:00 AM
Irradiation Enhanced Precipitation Over a Wide Range RPV Steel Compositions: New Physically Based Embrittlement Chemistry Factors: Nathan Almirall; Peter Wells; Takuya Yamamoto; G. R. Odette; 1University of California Santa Barbara

9:20 AM
Density Functional Theory Simulations of Solutes in Reactor Pressure Vessel Steels: Thomas Whiting; Daniel King; Patrick Bun; Mark Wenman; 1Imperial College London; 2University of New South Wales

9:40 AM
Irradiation-induced Precipitation in Ni-based Superalloys: Li-Jen Yu; Grace Burke; Emmanuelle Marquis; 1University of Michigan; 2University of Manchester

10:00 AM Break

10:20 AM Invited
Neutron Irradiation Studies on 14YWT Nanostructured Ferritic Alloys: Eda Aydogan; Jordan Weaver; Ursula Carvajal-Nunez; Jonathan Gigax; Enrique Martinez Saez; 2University of California Berkeley; 3University of California; 4University Of California, Berkeley

10:40 AM
Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Nanoprecipitates and Nanoclusters

11:00 AM
Irradiation Induced Segregation and Precipitation in PH 13-8 Mo Steel: Ce Zheng; Peter Hosemann; Djamel Kaoumi; 1North Carolina State University; 2University of California

11:30 AM
The Investigation of Phase Stability of a Nanoprecipitate Steel Following Heavy Ion Irradiation: Yao Li; Tengfei Yang; Suihe Jiang; Zhaoping Lu; Steven Zinkle; 1University of Tennessee; 2University of Science and Technology, Beijing
LIGHT METALS

Magnesium Technology 2019 — Thermomechanical Processing

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordan, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Tuesday AM | March 12, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: Norbert Hort, Helmholtz-Zentrum Geesthacht; Regine Willumeit Romer, Helmholtz-Zentrum Geesthacht

8:30 AM Invited
Evolution of Heterogeneous Microstructure of Equal-channel Angular Pressed Magnesium: Qizhen Li; Washington State University

9:00 AM Invited
Novel Magnesium Alloy Processing via Shear-assisted Processing and Extrusion (SHAPE): Suveen Mathaudhu; Nicole Overman; Scott Whalen; Matthew Olzsta; David Catalin; Karen Kruska; Jens Dansel; Vineet Joshi; Xiujuan "Hellen" Jiang; Arun Devaraj; Glenn Grant; Cynthia Powell; UC Riverside / Pacific Northwest National Laboratory; Pacific Northwest National Laboratory

9:30 AM
Effect of the Extrusion Temperature on Microstructure, Texture Evolution and Mechanical Properties of Extruded Mg-2.49Nd-1.82Gd-0.19Zn-0.4Zr Alloy
Wanqi Jie

9:50 AM
Influence of Thermomechanical Treatment on Tension-compression Yield Asymmetry of Extruded Mg-Zn-Ca Alloy
Patrik Dobron; Marius Hegedus; Juraj Olejnák; Daria Drozdenko; Klaudia Horváth; Jan Bohlen; Charles University; Helmholtz-Zentrum Geesthacht, MagiC

10:10 AM Break

10:30 AM
Homogeneous Grain Refinement and Ductility Enhancement in AZ31B Magnesium Alloy Using Friction Stir Processing: Vivek Patel; Wenyua Li; Quan Wen; Yu Su; Na Li; Northwestern Polytechnical University; Pandit Deendayal Petroleum University; Northwestern Polytechnical University

10:50 AM
Microstructure and Texture Evolution during Hot Compression of Cast and Extruded AZ80 Magnesium Alloy: Paresh Prakash; Amir Hadadzadeh; Sugrib Shaaha; Mark Whitney; Mary Wells; Hamid Jahed; Bruce Williams; Department of Mechanical and Mechatronics Engineering, University of Waterloo; Marine Additive Manufacturing Centre of Excellence (MAMCE), University of New Brunswick; College of Engineering and Physical Sciences, University of Guelph; CanmetMATERIALS, Natural Resources Canada

11:10 AM
A Review and Case-study on Mechanical Properties and Microstructure Evolution in Magnesium-steel Friction Stir Welding: Suryakanta Pal; Omkar Thoral; Raju Prasad Mahto; Suriya Kanta Pal; Prakash Sriramangalam; Indian Institute of Technology Kharagpur; Dr. Babasaheb Ambedkar Technological University; University of Warwick

SPECIAL TOPICS

Materials and Manufacturing Innovation Keynote: Autonomous Materials Research

Sponsored by: TMS: Materials Innovation Committee

Program Organizer: James Warren, National Institute of Standards and Technology

Tuesday AM | March 12, 2019
221D | Henry B. Gonzalez Convention Center

Session Chair: James Warren, National Institute of Standards and Technology

8:30 AM Introductory Comments

8:35 AM Keynote
Data, Disorder and Materials: Stefano Curtarolo; Duke University

9:15 AM Keynote
Towards Autonomous Materials Research Systems: Carla Gomes; Cornell University

10:50 AM Keynote
Towards Autonomous Materials Research Systems: Jason Hattrich-Simpers; National Institute of Standards and Technology

11:30 AM Panel Discussion

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Advanced Materials for Molten Salt Systems

Sponsored by: TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

Tuesday AM | March 12, 2019
009B | Henry B. Gonzalez Convention Center

Session Chair: Michael Short, Massachusetts Institute of Technology

8:30 AM Cladded Components for Molten Salt Reactors: Chemical Compatibility, Mechanical Effects, and the Potential Advantages of Functionally Graded Properties and Multi-material Systems: Mark Messner; T.-L. Sham; George Young; Zhili Feng; Argonne National Laboratory; Dominion Engineering; Oak Ridge National Laboratory
8:50 AM  
Directed Energy Deposition Fabrication of Mo-coated 316 Stainless Steel Components for Molten Salt Applications: Gabriel Merci de Bellefon; Shiva Rudraraju; Dan Thoma; 1University of Wisconsin, Madison

9:10 AM  
High-temperature, high-efficiency Silicon Carbide TRIPLEX Receiver Tubes for Next Generation Molten Salt Concentrated Solar Power: Matthew Walker; John Malloy; Herb Feinroth; Ken Armijo; Cliff Ho; Amy Bohinsky; Julius Yellowhair; 1Sandia National Laboratories; 1Ceramic Tubular Products LLC

9:30 AM  
Preliminary Chemical Durability Testing of Molten Salt Waste Forms: Richard Livingston; Luis Ortega; Sean McDeavitt; 1Texas A&M University

MATERIALS PROCESSING
Materials Processing Fundamentals — Alloys Processing and Properties Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelsil

Tuesday AM | March 12, 2019  
212A | Henry B. Gonzalez Convention Center

Session Chairs: Sam Wagstaff, Novelsil; Song Cai, Fort Wayne Metals

8:30 AM Introductory Comments

8:35 AM  
Influence of Omega Phase on Super-elastic and Fatigue Properties of a Beta Ti Alloy: Song Cai; Jeremy Schaffer; 1Fort Wayne Metals

8:55 AM  
Numerical Modelling and Influence of Cu Addition on the Microstructure and Mechanical Properties of Additive Manufactured Ti-Cu/Al/Ti-6AL-4V Composite: Olawale Fatoba; Esther Akinlabi; Stephen Akinlabi; 1University of Johannesburg

9:15 AM  
Nonequilibrium Solidification of Zn-6wt.% Al Alloy: Hongfa Hu; 1University of Windsor

9:35 AM  
Creating Nano-precipitates and Ultra-fine Grains in Mg-9Al (wt.%) and Mg-6Al (wt.%) Alloys during Low-temperature Equal Channel Angular Extrusion (ECAE): Suhas Eswarappa Prameela; Vance Liu; Stephanie Hernandez; Matthew Fernandez; Laszlo Kecskes; Tomoko Sano; Timothy Weihs; 1Johns Hopkins University; 1MatSys; 1U.S. Army Research Laboratory

9:55 AM  
High Cycle Fatigue Behaviour of Ultrafine Grained 5052 Al Alloy Processed Through Cryo-forging: Yogesha K K; Amit Joshi; Raviraj Verma; A Raja; R Jayaganthan; 1National Institute of Engineering; 2G. B. Pant Institute of Engineering &Technology Pauri (Garhwal), India.; 3Indian Institute of Technology Roorkee; 4Indian Institute of Technology Madras

10:15 AM  
Break

10:35 AM  
Mechanical Characteristics of Boron Nitride Nanotube and Magnesium Composites: Mitchell Hopper; 1Florida International University

10:55 AM  
Scalable Nanomanufacturing Approaches to Develop Advanced Metal Matrix Nanocomposites: Pranjali Naulyal; Benjamin Boesl; Arvind Agarwal; 1Florida International University

11:15 AM  
Effect of Heat Treatment on Microstructure of Continuous Unidirectional Solidified Cu—Ni—Sn Alloy: Jihui Luo; Qin Li; Yanhui Chen; Shu Liu; Qiuyue Wen; Huimin Ding; 1Yangtze Normal University

NUCLEAR MATERIALS
Mechanical Behavior of Nuclear Reactor Components — Defect Evolution I

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Tuesday AM | March 12, 2019  
215 | Henry B. Gonzalez Convention Center

Session Chairs: Samuel Briggs, Oregon State University; Meimei Li, Argonne National Laboratory

8:30 AM  
Invited Continuum Theory of Defects and Microstructure Evolution under Irradiation: Anter El-Azab; 1Purdue University

9:00 AM  
Understanding Deformation and Failure Mechanisms in Steels using High-Energy Synchrotron X-rays: Meimei Li; Xuan Zhang; Chi Xu; Fallon Laliberte; Jonathan Almer; Jun-Sang Park; Peter Keneisi; Xianghui Xiao; 1Argonne National Laboratory; 2University of Florida; 3Rensselaer Polytechnic Institute

9:20 AM  
EBSD and High Resolution EBSD Analysis of Strain-Induced Phenomena in Irradiated Austenitic Steels: Maxim Gussev; Keith Leonard; 1Oak Ridge National Laboratory

9:40 AM  
Irradiation Resistance of Mechanically Processed Zr-Nb Multilayers at Very High Doses: Madhavan Radhakrishnan; Daniel Savage; Marko Knezevic; Yongjiang Wang; Nathan Mara; Osman Anderoglu; 1University of New Mexico; 2University of New Hampshire; 3Los Alamos National Laboratory; 4University of Minnesota

10:00 AM  
Break

10:20 AM  
Invited Evolution of Hardening during Irradiation: Nanoindentation and Nanostructural Characterisation Approach: M Grace Burke; Alex Carruthers; 1University of Manchester

10:50 AM  
Multiscale Modeling of Dislocation/precipitate Interactions under Cyclic Loading: Shuozhi Xu; Irene Beyerlein; 1University Of California, Santa Barbara
11:10 AM
Multiscale Modeling of Radiation-induced Cu Precipitation Hardening in Fe-0.1at.%Cu: Xian-Ming Bai; Yaxuan Zhang; 1Virginia Polytechnic Institute

11:30 AM
On the Elementary Deformation Mechanisms Involved in the Singular Behavior of 15Cr-15Ni Fuel Cladding Tubes at Moderate Temperatures: Emilien Curtet; Bouzid Kedjar; Patrick Olier; Matthew Bono; Elodie Rouesne; Frédéric Mompiou; Ludovic Thilly; 1DEN-Service de Recherches Métallurgiques Appliquées, CEA, Université Paris-Saclay; 2Institut Pprime, DI/Axe PDP; 3DEN-Service d’Etudes des Matériaux Irradiés, CEA, Université Paris-Saclay; 4CEMES-CNRS

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocrystalline Materials I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewiecz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Tuesday AM | March 12, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Frederic Mompiou, CEMES-CNRS; Marc Legros, CEMES-CNRS

8:30 AM
In situ TEM Nanofabrication and Mechanical testing of Metallic Nanowires: Jiangwei Wang; 1Zhejiang University

8:50 AM
Investigating the Effect of Severe Surface Plastic Deformation on Sensitization and the Miniature Tensile Behavior of AA5083: Denise Yin; Heather Murdoch; B. Hornbuckle; Joseph Labukas; 1U.S. Army Research Laboratory

9:10 AM Invited
Grain-boundary Based Deformation Mechanisms: An In Situ TEM Perspective: Frederic Mompiou; Marc Legros; Nicolas Combe; 1CEMES-CNRS

9:40 AM
Deformation-induced Precipitation in Highly-immiscible Alloys at Low Temperature: Nirad Pant; Nisha Verma; Robert Averbach; Yion Ashkenazy; 2Pascal Bellon; 3University of Illinois at Urbana, Champaign; 3Hebrew University of Jerusalem

10:00 AM Break

10:20 AM Invited
Defining Hetero-epitaxial Relationships of Films on Substrates: Dominique Chatain; Paul Wymbutt; Anthony Rollett; Ulrich Dahmen; 1CNRS, Aix-Marseille University; 2Carnegie Mellon University; 3Lawrence Berkeley National Laboratory

10:50 AM
Ultrahigh-strength Low Carbon Steel Produced by Severe Plastic Deformation of Martensite: Andrea Bachmaier; Timo Müller; Marlene Kapp; Peter Felser; Reinhard Pippan; 1Erich Schmid Institute, Austrian Academy of Sciences; 2Erich Schmid Institute; 3Department of Material Science and Engineering, Institute I, Friedrich-Alexander Universität Erlangen-Nürnberg

11:10 AM
Thermal Analysis of Electrodeposited Nano-grained Ni-Mo Alloys: Yinhong Shi; Jian Hu; K. Lu; 1Imr Cas; 2School of Materials Science and Engineering, East China JiaoTong University

11:30 AM Invited
Changing Mechanical Properties of Nanoporous Metals by Surface Modification and the Impact of Capillarity: Jürgen Markmann; Nadia Mameka; 1Helmholtz-Zentrum Geesthacht

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — Advances in Micromechanical Testing Techniques

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Nanomechanical Materials Behavior Committee

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afroz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday AM | March 12, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Hosemann, University of California, Berkeley; James Gibson, RWTH Aachen

8:30 AM Invited
Elevated Temperature Nanomechanical Mapping and Approaches to High-throughput Mechanical Testing of Fe-based Alloys: Nathan Mard; Douglas Stauffer; Eric Hintzala; Bartosz Nowakowski; Youxing Chen; Jordan Weaver; Siddhartha Pathak; Ashley Reichardt; Peter Hoosemann; 1University of Minnesota; 2Bruker Nano Surfaces Division; 3National Institute of Standards and Technology; 4University of Nevada, Reno; 5University of California, Berkeley

8:55 AM
Mechanical High-temperature Characteristics of FCC/BCC Metal Nanocomposites Investigated by Means of Advanced Nanoindentation Techniques: Alexander Leitner; Verena Maier-Kiener; Daniel Kiener; 1Montanuniversität Leoben

9:15 AM
Measuring Stress-strain Curves of Metals by Nanoindentation with a Frustum: Jennifer Hay; 1Nanomechanics

9:35 AM Invited
High Speed Nanomechanical Property Mapping and Data Deconvolution: Sudharshan Phani Pardhasaradhi; Vignesh B; Siva Kumar G; Warren Oliver; 1ARCI; 2Nanomechanics Inc.

10:00 AM
In Operando High Speed Nanoindentation Mapping: Eric Hintzala; Douglas Stauffer; 1Bruker Nano Surfaces

10:20 AM Break

10:40 AM Invited
Mapping Strains at High Temperature on Micromechanical Testpieces: Thomas Edwards; Fabio Di Gioacchino; Robert Jones; Gaurav Mohanty; Juri Wehrs; William Clegg; Johann Michler; 1EMPA; 2University of Cambridge; 3Rolls-Royce plc

11:05 AM
Exploring Grain Boundary-defect Interactions in Pt and Pt-Au using In Situ TEM High Cycle Fatigue: Christopher Barr; Khalid Hattar; 1Sandia National Laboratories
11:25 AM
Dislocation Structure and GB Movement in W at RT during Grain Boundary Pop-in: Karsten Durst1; Farhan Javaid2; 1TU Darmstadt

11:45 AM
Investigation of the Effects of Thermal Treatment and Coldwork on Grain Boundary Strength in Alloy 600 for Stress Corrosion Cracking: Hi Vo1; Evan Still2; Rasheed Augustine3; Joey Kabel3; Daniel Schreiber4; Kiet Lam5; Peter Chou4; Peter Hosemann4; 1University of California, Berkeley; 2Pacific Northwest National Laboratory; 3EPRI

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session II

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

Tuesday AM | March 12, 2019
303B | Henry B. Gonzalez Convention Center

Session Chairs: Donghwa Lee, Pohang University of Science and Technology; Vinamra Agrawal, Auburn University; Dinesh Pinisetty, CSU Maritime Academy

8:30 AM Invited
Microstructure Design Tool to Optimize the Thermal Conductivity of Composite Structures: Floyd Hilty1; Michael Tonks2; 1University of Florida

8:50 AM Invited
Interface Control of Material Functionality: Valentino Cooper1; 1Oak Ridge National Laboratory

9:10 AM
Phase Field Damage Modeling of Mechanical Degradation in Polymers Composites under Hydro-thermo-mechanical Loading Conditions: Vinamra Agrawal1; 1Auburn University

9:30 AM Invited
Unraveling the Mechanisms of Nanostructural Self-assembly in Physical Vapor-deposited Immiscible Alloy Films: Rahul Raghavan1; Kumar Ankit2; 1Arizona State University

9:50 AM Break

10:30 AM Invited
Multiscale Modeling of Transition Metal-chemically Modified Graphene Based Nanocomposites: Krishna Muradalharan1; 1University of Arizona

10:50 AM Invited
Unraveling the Dynamic Toughening Mechanisms of Bioinspired Composites under Extreme Loading Conditions: Grace Gu1; 1University of California, Berkeley

11:10 AM Invited
First-principles Investigation on Mn Segregation at Ferrite-cementite Interface: Donghwa Lee1; Jae-Bok Seol1; 1Pohang University of Science & Technology

11:30 AM
Graph Theoretic Analyses of Fiber-scale Data to Determine Defect Strength of Transversely Loaded Fiber-reinforced Composites: Sia Sin Quek1; Sridhar Narayanaswamy1; Brian Cox2; 1Institute of High Performance Computing; 2Arachne Consulting

ELECTRONIC MATERIALS


Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; ChaoHong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing Univ; Dajian Li, Karlruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

Tuesday AM | March 12, 2019
217D | Henry B. Gonzalez Convention Center

Session Chairs: Hiroshi Nishikawa, Osaka University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences

8:30 AM Invited
Advanced Electroplating Technologies for 2.5D and 3D Chip Packaging Fabrication: Wei-Ping Dow1; 1National Chung Hsing University

8:50 AM
Abnormal Growth of Intermetallic compounds in Sn/Cu Diffusion Pair: Yiram Kim1; Hossein Madanipour2; Choong-un Kim2; 1University of Texas, Arlington

9:10 AM
A Model to Describe Kinetics of Intermetallic Compound with Narrow Homogeneity Range: Cu-Sn System as an Example: Yuan Yuan2; Dajian Li2; Nele Moelans2; Fusheng Pan2; 1Chongqing University; 2Karlsruhe Institute of Technology; 3KU Leuven

9:30 AM
The Investigation of the Interaction Between Cu, Sn and Sn3.5Ag under Thermomigration: Jou-Hsuan Li1; Fan-Yi Ouyang1; Yuan-Ruei Hsu1; 1National Tsing Hua University

9:50 AM
Growth Behavior of Compounds during Reactive Diffusion between Solid Co and Liquid Sn-base Solders: Minho O1; Masanori Kajihara2; 1Tokyo Institute of Technology

10:10 AM Break

10:30 AM Invited
Interfacial Microstructure Variation of ENIG/SAC305 Solder Joint with Ni-P Electroless Plating Bath: Sehoon Yoo1; Wonil Seo1; Sungwook Mhn1; Young-Ho Kim1; 1KITECH; 2Hanyang University

10:50 AM
Solder Joint Design Elements: Impact of Ni in Cu-alloys on Intermetallic Compound Formation and Properties: Christian Wieser1; Andreas Leineweber1; Werner Huegel1; 1Robert Bosch GmbH; 2TU Freiberg

11:10 AM
Interfacial Reactions between Lead-Free Solders and the Ni-xPd-yCo Alloys: Kuo Jung Chen1; Mei-Ting Lai1; Chih-Ming Chen2; Yu-Chun Lin2; Yee-Wen Yen2; 1National Taiwan University of Science and Technology; 2National Chung Hsing University
11:30 AM
The Improvement of Solderability for Diamond/Al Composite by Electroless Plating of Ni-P Coating Film: Zhi-Quan Liu1; Qi-Yuan Shi1; Hao Zhang1; 1Institute of Metal Research, Chinese Academy of Sciences; 2Institute of Scientific and Industrial Research, Osaka University

11:50 AM
The Study on Currents Stress Effects of Electromigration on IMC Formation: Ching Chun Chiu1; Po-Hsun Wang1; Wei-Jhen Chen1; Ming-Tzer Lin1; 1National Chung Hsing University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformations in Steels and Non-ferrous Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhrithi Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Tuesday AM | March 12, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Ashley Paz Y Puente, University of Cincinnati; Alexis Deschamps, Genoble Institute of Technology

8:30 AM
Recrystallization of a Niobium-stabilized Austenitic Stainless Steel: Nicolas Cliche1; Eric Georges2; Philippe Petit1; Jean-Loup Heuzé1; Anne-Françoise Courguès-Lorenzon2; Jacques Bellus3; Sylvain Ringeval1; 1CEA; 2Aubert & Duval; 3DGA; 4MINES ParisTech; PSL Research University, Centre des Matériaux, UMR CNRS 7633

8:50 AM
Influence of Strain Rates on the Stability of Retained Austenite under Tension-compression Loading in High Carbon Steel: Amborish Banerjee1; B. Prusty1; 1University of New South Wales

9:10 AM
Laves Phase Stability of Creep Resistant FeCrAl Alloys at Elevated Temperature: Chih-Hsiang Kuo1; Benjamin Shassere2; Jonathan Papolavsky2; Yukinori Yamamoto3; Sudarsanam Babu1; 1University of Tennessee; 2Oak Ridge National Laboratory

9:30 AM
Anomalous X-ray Diffraction from α Particles in a Metastable β-Ti Alloy: Jana Šmilauerová1; Petr Harcuba1; Václav Holý1; 1Charles University

9:50 AM
In Situ Study of Transformation in TiNiTiNOL using Neutron and High Energy Diffraction Experiment: Jinesh Dahal1; Aaron Stebner1; 1Colorado School Of Mines

10:10 AM Break

10:30 AM
Microstructural Evolution and Phase Transformations in U-10Mo Alloys with Varying Zr Content after Heat Treatments Relevant to the Monolithic Fuel Plate Fabrication Process: Abhishek Mehta1; Nicholas Eriksson2; Ryan Newell1; Le Zhou1; Esin Schulz2; William Sprowes2; Felipe Betancor1; Youngjoo Park1; Dennis Keiser, Jr.1; Yongho Sohn1; 1University of Central Florida

10:50 AM
Negative and Positive Tailorable Thermal Expansion in Shape Memory Alloys: Dominik Gehring1; Ibrahim Karaman2; 1Texas A&M University

11:10 AM
Oxygen Influence on Omega and Alpha Phase Transformations in Ti-Nb Alloys: Kathleen Chou1; Emmanuelle Marquis1; 1University of Michigan

11:30 AM
Phase Identification and Microstructural Evolution of Al6061 Powder Using In-Situ TEM: Benjamin Bedard1; Siram Vijayan2; Mark Aindow2; 1University of Connecticut

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Densification Methods

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Tuesday AM | March 12, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Brady Butler, Army Research Laboratory

8:30 AM Invited Below 30 Nanometers: Unlocking the Potential of Very Small Grain Sizes in Dense Nanocrystalline Ceramics: James Wolmershauser1; Boris Feigelson1; Heonguise Yu1; Eric Patterson1; Edward Gorzkowski1; 1US Naval Research Laboratory; 2American Society for Engineering Education Postdoctoral Research Fellow situated at U.S. Naval Research Laboratory

9:00 AM
Control of Electric Current Pathway in Field-Assisted Sintering: Eugene Olevsy1; Geuntakt Lee1; Elisa Torresani1; 1San Diego State University

9:30 AM
Kinetics and Densification Behavior during Reaction Sintering of Bulk Titanium Boride (TiB) Nanoceramics by Electric Field Activated Sintering: K. S. Ravi Chandran1; Jun Du1; 1University of Utah

9:50 AM
Combustion Synthesis of Silicon-based Nanostructured Materials: Sergio Cordova1; Rodrigo Mesta1; Evgeny Shafirovich1; 1University of Texas, El Paso

10:10 AM Break

10:30 AM
Nano-carbon Reinforced Metal Matrix Composites Fabricated by Powder Metallurgy Process: Katsuyoshi Kondoh1; Biao Chen1; Junko Umeda1; 1Osaka University; 2Northwestern Polytechnical University

10:50 AM
Requirements of NFPA 652 Standard on Combustible Dust: Are your Powder Processes Compliant?: Vahid Ebadat

11:10 AM
Laser-Assisted Cold Spray Deposition of Ferritic Oxide Dispersion Strengthened Alloys: Dallin Barton1; William Story2; B. Hornbuckle2; Kristopher Darling2; Luke Brewer2; Gregory Thompson2; 1University of Alabama; 2US Army Research Laboratory
11:30 AM
Synthesis of Bulk Nanocrystalline Copper with Ultrasonic Powder Compaction: Christopher Hareland1; Austin Ward1; Zachary Cordero1; 1Rice University

11:50 AM
Bulk Nanostructured Rods from Gas Atomized AL-12.4TM Powder using Shear Assisted Processing and Extrusion (ShAPE): Scott Whalen1; Nicole Overman1; Jens Darselli1; Md. Reza-E-Rabby2; Wayne Daye3; Tom Pelletiers2; 1Pacific Northwest National Laboratory; 2Kymera International - SCM Metals

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals III

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

Tuesday AM | March 12, 2019
210B | Henry B. Gonzalez Convention Center

Session Chairs: Shafiq Aalam, University of Saskatchewan; Gisele Azimi, University of Toronto

8:30 AM
Recovery of Manganese by Roasting-ammonia Leaching from Low-grade Manganese Carbonate Ores: Zhongbing Tu1; Xiaoping Liang1; Xiangguan Yang1; Shilei Ren1; Chengbo Wu1; Yu Wang1; 1Chongqing University

8:55 AM
General Rules for Deep Purification of Low-grade Molybdenite Concentrates: Junjie Yu1; Hu Sun1; Jun Luo1; Li Guanghui1; Tao Jiang1; 1Central South University

9:20 AM
Production of High-purity Titanium Dioxide from Spent Selective Catalytic Reduction (SCR) Catalyst: Gyeonghye Moon1; Jin-Hyung Kim1; In-hyeok Choi1; Hee-Nam Kang1; Tae-Hyuk Lee1; Jin-Young Lee1; Jungshin Kang1; 1Korea Institute of Geoscience and Mineral Resources

9:45 AM
Reduction of TiCl4 to TiH2 with CaH2 in Presence of Ni Powder: Mohammad Rezaei Ardani1; Aws Sadoon Mohammed Al Janabi1; Sanjith Udayakumar1; Sheikh Rezan1; M.N. Ahmad Fauzi2; Abdul Rahman Mohamed3; H.L. Lee4; Ismail Ibrahim1; 1Universiti Sains Malaysia

10:10 AM Break

10:30 AM
Novel Application of Microwave Pre-Treatment for the Valorization of Rare Earth Elements from Phosphogypsum: Adrian Lambert1; John Anawati1; Mudhia Watalawalkar1; Jason Tam1; Gisele Azimi1; 1University of Toronto

10:55 AM
Experimental Study on the Treatment of Zinc-containing Rotary Hearth Furnace Dust: Shilei Ren1; Xiaoping Liang1; Zhongbing Tu1; Qian Tang1; Xiangguan Yang1; Yu Wang1; 1Chongqing University

11:20 AM
Synthesis of Tungsten Carbides by Reducing and Carbonizing WO3 with CO: Yijie Wu1; Jie Dang1; Zepeng Lv1; Run Zhang1; 1Chongqing University

ENERGY & ENVIRONMENT

REWAS 2019: Plenary Session

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Mertol Gökelma, Norwegian University of Science and Technology; John Howarter, Purdue University; Randolph Kirchain, Massachusetts Institute of Technology; Kaka Ma, Colorado State University; Christina Meskers, Umicore; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology; Adam Powell, Worcester Polytechnic Institute; Fiseha Tesfaye, Abo Akademi University; Mingming Zhang, ArcelorMittal Global R&D

Tuesday AM | March 12, 2019
007C | Henry B. Gonzalez Convention Center

Session Chairs: Randolph Kirchain, Massachusetts Institute of Technology; Adam Powell, Worcester Polytechnic Institute

8:30 AM Plenary
Recycling of Critical Metals: Toru Okabe1; Takanari Ouchi1; 1University of Tokyo

9:00 AM Plenary
Supply Chains for Battery Materials: Ben Jones1; 1CRU

9:30 AM Plenary
Implications of an Evolving Electronic Waste Stream: Callie Babbitt1; 1Rochester Institute of Technology

10:00 AM Break

10:20 AM Plenary
Is Sustainability Less Than the Sum of Its Parts?: David Wagter1; 1Institute of Scrap Recycling Industries, Inc.

10:50 AM Plenary
Mineral Exploration of the Urban Mine: Dynamics of Aluminum Stocks and Flows: Chris Bayliss1; 1International Aluminum Institute

11:20 AM Plenary
A New Thinking in Metals Recycling: Ramana Reddy1; 1The University of Alabama

11:50 AM Plenary
Challenges of the Circular Economy: Markus Reuter1; 1Helmholtz-Institute Freiberg for Resource Technology
**MATERIALS PROCESSING**

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell’s 80th Birthday — Process Innovation and Modelling

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

**Program Organizers:** Mural Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

**Session Chair:** William Griffiths, University of Birmingham

Tuesday AM | March 12, 2019
006B | Henry B. Gonzalez Convention Center

8:30 AM The Nemak Cosworth Casting Process Latest Generation: Glenn Byczynski1; Robert Mackay; Nemak

8:55 AM Campbellology for Runner System Design: Fu-Yuan Hsu2; National United University

9:20 AM A Solidification Model with Application to AlSi-based Alloys: Adrian Catalina1; Liping Xue2; Charles Monroe3; Flow Science, Inc.; The University of Alabama

9:40 AM Physical Modelling of Transport Phenomena in Asymmetrical Multi-strand Tundish with Retaining Wall: Wei Xiao1; Yanping Bao1; National University of Science and Technology Beijing

10:00 AM Break

10:20 AM The Validation of Feeder Modeling for Ductile Iron Castings: Fu-Yuan Hsu1; Yu-Hung Chen1; National United University

10:40 AM The Contactless Electromagnetic Sonotrode: Koulis Pericleous1; Valdis Bojarevics1; Georgi Dzambazov2; Agnieszka Dybalska2; William Griffiths3; Catherine Tonry4; University of Greenwich; University of Birmingham, UK

11:00 AM Simulation Analysis Techniques for Investment Casting Process of Ni-Based Superalloy Components: Kasuha Fujiwara1; Hidetaka Oguma1; Masaki Taniike1; Ikio Okada1; Kyoko Kawagishi2; Tadaharu Yokokawa2; Hiroshi Harada2; Mitsubishi Heavy Industries, Ltd.; National Institute for Materials Science

11:20 AM Improvement in Metallurgical Properties of Gravity Die Cast 2024-T6 Aluminum Alloy via Cryogenic Process: Engin Tan1; Sinan Aksöz1; Yavuz Kaplan1; Hilal Can1; Derya Dispinar1; Pamukkale University; Istanbul University

11:40 AM Melt Cleaning Efficiency of Various Fluxes for A356 Alloy: Caglar Yulsel1; Ugur Aybar1; Eray Erzi1; Derya Dispinar2; Mustafa Cigdem2; Ataturk University; CMS; Istanbul University; Yildiz Technical University

**LIGHT METALS**

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Shape Casting and Defects

**Sponsored by:** TMS: Solidification Committee

**Program Organizers:** Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Tuesday AM | March 12, 2019
006C | Henry B. Gonzalez Convention Center

8:30 AM Keynote Porosity in Castings: Mark Jolly1; Cranfield University

8:50 AM Keynote Twin-roll Casting of Mg Alloys: Nach Kim1; Pohang University of Science and Technology

9:10 AM Invited Practical Experiences Using Knowledge to Solve Mysterious Problems: Salvador Valtierra1; Namak

9:30 AM Invited Effects of Si Macrosegregation of the Constitutive Behaviour of A356: Hatef Khadivinassab1; Daan Majier1; Steve Cockcroft1; University of British Columbia

9:50 AM Invited Modelling of Shrinkage-induced Species Macrosegregation in A356 Aluminum Wheel Casting: Pan Fan1; Steve Cockcroft1; Daan Majier1; Lu Yao2; Carl Reilly2; Andre Phillion2; University of British Columbia; Cast Analytics Inc.; McMaster University

10:10 AM Break

10:30 AM Keynote Prediction of Hot Tearing “Down Under” the Root of Dendrites during Direct Chill Casting: Niloufar Khodaei1; Andre Phillion1; McMaster University

10:50 AM Invited Deformation and Defect Formation in Partially Solid Alloys: Christopher Gourlay1; Te-Cheng Su1; Catherine O’Sullivan1; Hideyuki Yasuda1; Imperial College London; Kyoto University

11:10 AM Study on the Hot Tearing Susceptibility of Mg-Gd Binary Magnesium Alloy: Guangyu Yang1; Shifeng Luo1; Zhen Zou1; Wanqi Jie1; Northwestern Polytechnical University

11:30 AM Compositional Templatting for Heterogeneous Nucleation of Intermetallic Compounds: Zhongping Que1; Zhongyun Fan1; Yun Wang1; Brunel University
MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session III

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhruti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday AM | March 12, 2019
301A | Henry B. Gonzalez Convention Center

Session Chairs: Saurabh Puri, Microstructure Engineering: Arunabha Roy, University of Michigan-Ann Arbor

8:30 AM Introductory Comments
8:35 AM Keynote
Dislocation Dynamics Simulation for Predicting Precipitation Strengthening in Mg-Nd Alloys: Arunabha Mohan Roy1; Chaoming Yang1; Zhihua Huang2; Amit Misra3; John Allison4; Liang Qi5; 1University of Michigan

9:15 AM
In Situ Micro-mechanical Characterization and Multiscale Modeling of Thermo-mechanical Properties of Micro-architected Tungsten Coating: Quan Jiao1; Jiahao Cheng2; Gidong Sim3; Jaafar El-Awady4; 1The Johns Hopkins University; 2KAIST

9:35 AM
Diffuse Interface Approach to Modeling Crystal Plasticity with Accommodation of Grain Boundary Sliding: Tianle Cheng1; Youhai Wen2; Jeffrey Hawk3; 1National Energy Technology Laboratory / AECON; 2National Energy Technology Laboratory

9:55 AM
Nano-mechanics-based Characterization of Radiation-tolerance for Reduced-activation Ferritic/Martensitic (RAFM) Steel: Ye-Eun Ne1; Wooin Jeong2; Myung-Gyu Lee3; Dongchan Jang4; 1KAIST; 2Seoul National University

10:15 AM Break

10:35 AM
Modeling the Contribution of Deformation Twinning to the Temperature and Rate Dependent Strength of Tantalum: Anik Faisal5; Christopher Weinberger6; 1Colorado State University

10:55 AM
The Connection Between Ideal Stresses and Deformation Mechanisms in BCC Refractory Metals: Chaoming Yang1; Liang Qi2; 1University of Michigan

11:15 AM
Mesoscale Simulation of Microstructure Dependent Fracture in Hydrided Zircaloy Structure: Hao Wang1; Vikas Tomar1; 1Purdue University

11:35 AM
Modelling of Grain Boundary Segregation and Precipitation in Multi-component Al Alloys Subjected to Heat Treatment: Dongdong Zhao1; Sylvain Gouttebroze2; Jesper Friis3; Yanjun Li4; 1Norwegian University of Science and Technology; 2INTEF

LIGHT METALS

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Aluminum

Sponsored by: DGM (Deutsche Gesellschaft für Materialkunde eV), TMS: Magnesium Committee, TMS: Aluminum Committee

Program Organizers: Eric Nyberg; Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

Tuesday AM | March 12, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products

8:30 AM Introductory Comments
8:40 AM
A Novel Flexible SSM and HPDC Equipment to Process Secondary Aluminium Alloys for Decarbonising Lightweight Parts in Automotive Sector: Fabrizio D’Errico1; Guido Perricone2; Mattia Allemanni3; 1Politecnico Di Milano Politecnico Di Milano; 2Brembo Spa

9:00 AM
The Effects of Strontium Addition on the Microstructures and Mechanical Properties of Al-7Si Alloy Reinforced with In-situ A3Ti Particulates: Siming Ma1; Xiaoming Wang2; 1Purdue University; 2Purdue University

9:20 AM
Mechanical and Microstructural Characterization of Ultrasonic Metal Welded Large Cross Section Aluminum Wire/Copper Terminal Joints: Andreas Gester1; Guntram Wagner2; Ingo Kesel3; Friedhelm Guenter4; 1Technische Universität Chemnitz; 2Robert Bosch GmbH Renningen

9:40 AM
The Dependence of Local Strain Distribution on Quench Rate for Extruded Al-Mg-Si-Mn-Alloy: Warren Poole1; Mojtaba Mansour2; Nick Parson3; Mei Li4; 1University of British Columbia; 2Rio Tinto Aluminium; 3Ford Motor Company

10:00 AM Break

10:20 AM
The Effect of through Thickness Texture Variation on the Anisotropic Mechanical Response of an Extruded Al-Mn-Fe-Alloy: Jingqi Chen1; Nick Parson2; Warren Poole1; 1University of British Columbia; 2Rio Tinto Aluminium

10:40 AM
Increasing the Strength and Electrical Conductivity of AA6101 Aluminium by Nanostructuring: Rilee Meagher1; Mathew Hayne2; Julie DuClos3; Casey Davis4; Terry Lowe5; Tamás Ungár6; 1Novelis Inc; 2University of Virginia; 3Ford Motor Company; 4Brembo; 5Braeburn; 6Purdue University

11:00 AM
Assessing the Impact of Texture and its Gradients on the Forming Limits of an AA6xxx Sheet Alloy: Jishnu Bhattacharyya1; Nathan Peterson2; Richard Burrows3; David Anderson4; Fatih Sen5; Vishwanath Hegadekatte6; Sean Agnew7; 1University of Virginia; 2Purdue University; 3National Energy Technology Laboratory; 4University of British Columbia; 5University of Michigan; 6Colorado School of Mines; 7Eötvös University; 8Ford Motor Company

11:20 AM
Forming Limits of an AA6xxx Sheet Alloy: Jingqi Chen1; Nick Parson2; Warren Poole1; 1University of British Columbia; 2Rio Tinto Aluminium; 3Ford Motor Company
MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — High Temperature Processing

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baqun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Tuesday PM | March 12, 2019
208 | Henry B. Gonzalez Convention Center

Session Chairs: Zhiwei Peng, Central South University; Elsa Olivetti, Massachusetts Institute of Technology

2:00 PM Introductory Comments

2:05 PM
The Reduction Performance of the Ca2 (Fe2-xAlx) O5 Solid Solution: Fei Liao1; Xing-Min Guo1; 1University of Science and Technology Beijing

2:25 PM
Determination of Minimum Practical Sintering Temperature of Potential HEA Alternative Binders for Cemented Carbides: Jannette Chorney1; Jerome Downey1; Grant Wallace1; Marc D'Abere1; 1Montana Tech

2:45 PM
Effects of Temperature and Alkali Carbonates on Graphitization and Metallurgical Properties of Coke: Rongjin Zhu1; Shengfu Zhang1; Guangsheng Suo1; Yue Wu1; Xiaohu Zhou1; Shuxing Qiu1; 1Chongqing University

3:05 PM
Field-assisted Sintering of Nickel-based Superalloy Powder for High Temperature Hybrid Turbine Disk Applications: Charis Lin1; Sebastian Niemari1; Namiko Yamamoto1; Anil Kulkarni1; Jogender Singh1; 1Penn State University

3:25 PM Break

3:45 PM
Sintering Test Research of High Proportion Limonite: Zhao Qiang1; 1University of Science and Technology Beijing

4:05 PM
Stainless Steel Extrusions and Cold Draw Process to Achieve Properties for Elevated Temperature Applications: Debajyoti Maltra1; Cody Traylor1; Phani Gudipati1; 1Plymouth Tubing Company

4:25 PM Concluding Comments

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Powder Metallurgy and Additive Manufacturing

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Tuesday PM | March 12, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Gang Chen, University of Science and Technology Beijing; Hojong Kim, Pennsylvania State University

2:00 PM Invited Product Driven Process Research for AM Powder Production: Ali Asgarian1; Eric (Cheng Tse) Wu1; Kinnor Chattopadhyay1; 1University of Toronto

2:30 PM Invited
Preparation and Formation Mechanism of Dispersed Er2O3 Doped Mo Super-fine Powders and Agglomerated La2O3 Doped Mo Powders: Jinshu Wang1; 1Beijing University of Technology

3:00 PM Invited
Sintering of Titanium Alloys from the Core-shell Structured Titanium@ Metal Powders: Yafeng Yang1; Shaofu Li1; 1Institute of Processing Engineering Chinese Academy of Science

3:30 PM Break

3:50 PM Invited
Static Magnetic Field has Impact on Solidification Structure of Metallic Samples Fabricated via Additive Manufacturing: Jiang Wang1; Zhongming Ren1; 1Shanghai University

4:20 PM Invited
Cost-affordable Ti Powders for Additive Manufacturing Treated by Fluid-bed: Gang Chen1; Wangwang Ding1; Mingli Qin1; Wei Cai1; Xuanhui Qu1; 1University of Science and Technology Beijing; 1Stanford University

4:50 PM
New Insights into Interfacial Reactions between CBN and Cu-Sn-Ti Active Filler Metals: Yonggang Fan1; Cong Wang1; 1Northeastern University
NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS


Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Tuesday PM | March 12, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Stephen McDonnell, University of Virginia; SungWoo Nam, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, University of Illinois; Jiyoung Chang, University of Utah; Pei Dong, George Mason University

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory

TMS: Nanomaterials Committee

Sponsored by:

II

Nanomaterials — Two-dimensional Nanomaterials
Synthesis, Integration, and Application of Emerging Nanomaterials — Two-dimensional Nanomaterials II

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries II

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Tuesday PM | March 12, 2019
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Session Chairs: Partha P. Mukherjee, Purdue University; George Nelson, University of Alabama, Huntsville

2:00 PM Keynote
Defining Conduction Pathways in Cathode Materials: Resolving Logjams through Atomistic Design and Mesoscale Structuring: Sarbajit Banerjee1; Partha Mukherjee1; Texas A&M University

2:30 PM Invited
Multiscale Analysis of Lithium Ion Battery Materials Using X-ray Tomography: Thushananth Rajendra1; Prehit Patel1; George Nelson1; University of Alabama in Huntsville

2:55 PM Keynote
Lithium Battery Characterization Using Neutron Imaging Techniques: Hassina Bilheux1; Robert Schmidt1; Jagjit Nanda1; Nancy Dudney1; Jean Bilheux1; Oak Ridge National Laboratory

3:25 PM Break

3:45 PM
Exploiting Piezoelectrochemical Phenomena in Lithium-ion Batteries for Low Frequency Mechanical Energy Harvesting and Storage: Craig Arnold1; Juliane Preimesberger1; Seung-Yeon Kang1; Princeton University

4:05 PM
In Situ Electrochemical Dilatometry Study of Capacity Fading in Nanoporous Ge-based Na-ion Battery Anode during Sodiation-desodication Cycles: Manni Li1; Eric Detsi1; University of Pennsylvania

4:25 PM
Mechanistic Understanding of Multi-modal Degradation in Lithium Battery Electrodes: Ankit Verma1; Partha Mukherjee1; Purdue University

4:45 PM Invited
Elucidating the Role of Mesoscale Morphology on Lithium-ion Battery Mechanical and Electrochemical Performance through Mesoscale Simulation: Scott Roberts1; Dan Bolintineanu1; Mark Ferrari1; Jeremy Lechman1; David Noble1; Ishan Srivastava1; Bradley Trembacki1; Sandia National Laboratories
SPECIAL TOPICS

Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM | March 12, 2019
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Session Chair: Carolyn Hansson, University of Waterloo

3:15 PM Introductory Comments

3:25 PM Invited
Acta Materialia Gold Medal Lecture: Stabilizing Nanostructures in Metals: Ké Lu1; 2Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

3:45 PM Question and Answer Period

3:55 PM Invited
Acta Materialia Silver Medal Lecture: Generation of Interfacial Dislocations Loops to Overcome the Nucleation Barrier of Tetrahedron Shaped Precipitates: Xavier Sauvage1; 2Groupe de Physique des Matériaux, CNRS, Université Rouen Normandie

4:15 PM Question and Answer Period

4:25 PM Invited
Acta Materialia Hollomon Award for Materials and Society Lecture: When Science Matters: Alexander King1; 2Iowa State University

4:45 PM Question and Answer Period

5:00 PM
An Update on Materialia and on the Preprint Server MatSciRN: Christopher Schuh1; 2Massachusetts Institute of Technology

5:30 PM Wine and Cheese Reception

ADDITIVE TECHNOLOGIES


Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoldt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

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Session Chair: David Bourell, University of Texas

2:00 PM
3D Characterization of Solidification-induced Orientation Gradients in Additively Manufactured Stainless Steel: Andrew Polonsky1; 2William Lenthe2; 3McLean Echlin1; 4Veronica Livescu1; 5George Gray1; 6Tresa Pollock1; 7University of California, Santa Barbara; 8Carnegie Mellon University; 9Los Alamos National Laboratory

2:20 PM
Build Environment Pressure Effects on SLM Processing of 316L Stainless Steel: Jonathan Gibbs1; 2Stuart Baker2; 3Ryan Penny2; 4Christoph Meier4; 5David Griggs4; 6A. John Hart4; 7U.S. Naval Academy; 8U.S. Air Force Research Laboratory; 9Massachusetts Institute of Technology; 10Technical University of Munich

2:40 PM
The Effect of Welding Process Parameters on Microstructure, Creep Strength and Fracture Toughness of 22V Submerged Arc Weldments: Harrison Whitt1; 2Michael Kottman2; 3Ben Schaeffer2; 4Michael Mills1; 5Ohio State University; 6The Lincoln Electric Company

3:00 PM
Print Pattern Impact on the Material Properties of Metal Big Area Additively Manufactured Multi-layered Steel Interfaces: Eric Tenuta1; 2Andrzej Nycz2; 3Mark Noakes2; 4Srdjan Simunovic2; 5Mark Piro1; 6University of Ontario Institute of Technology; 7Oak Ridge National Laboratory

3:20 PM
Thermal Modeling of Maragoni Flow in the Meltpool for SS 17-4 PH Stainless Steel in Selective Laser Melting: Yi Sun1; 2Daniel Galles2; 3Xiaohan Zhang3; 4Wei Cai3; 5Adrian Lew3; 6Stanford University; 7Oak Ridge Institute for Science and Education

3:40 PM Break

4:00 PM
Effect of Thermal Cycles on the Microstructure of 17-4 PH Stainless Steel Parts Prepared by Selective Laser Melting: Yu Sun1; 2Mark Aindow1; 3Rainer Hebert1; 4University of Connecticut

4:20 PM
Laser Additive Repair of Cast Ni-Al-Bronze Components: Xinjin Cao1; 2P. Wanjara1; 3J. Gholipour1; 4Y. Wang1; 5National Research Council Canada - Aerospace; 6Defence Research and Development Canada

4:40 PM
Morphological Features of Melt Pool in Selective Laser Melting of Inconel 738LC Alloy: Teresa Guraya1; 2Amir Safwan Anuar2; 3Sarat Singamneni2; 4Zhan Chen2; 5University of the Basque Country; 6Auckland University of Technology

5:00 PM
Development of Tailor-made Properties via Additive Manufacturing of Functionally Graded Inconel 718: Y. A. Popovich1; 2E. V. Borisov1; 3V. Sh. Sufiarov1; 4A. A. Popovich2; 5Delft University of Technology; 6Peter the Great Saint-Petersburg Polytechnic University

5:20 PM
Quantifying Microstructure Variability in Large-scale 3D Printed Metals Using Optical Microscopy: Matteo Seit1; 2Ekta Jain1; 3Nanyang Technological University
**ADDITIVE TECHNOLOGIES**

Additive Manufacturing for Energy Applications — Design, Process Optimization and Qualification

**Sponsored by:** TMS: Nuclear Materials Committee

**Program Organizers:** Isabellia Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

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**Session Chair:** Somayeh Pasebani, Oregon State University

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2:00 PM Invited

Impact of Powder Feedstock Compositions on the Additive Manufacturing of Corrosion Resistant Alloys for Energy Applications: Todd Palmer1; Pennsylvania State University

2:30 PM

Electrical Resistivity of Pure Copper Processed by Medium-powered Laser Powder Bed Fusion Additive Manufacturing for Use in Electromagnetic Applications: Leonidas Gargalitis1; Cassidy Sibernagel1; Richard Hague1; Ian Ashcroft1; Phil Dickens1; University of Nottingham, Center for Additive Manufacturing

2:50 PM

Powder Surface Characterization toward Powder Feedstock Screening for AM: Timothy Prost1; Dapeng Jing2; Michael Kirka1; Emma White1; Iver Anderson1; Emma White1; Iver Anderson1; Ames Laboratory; Iowa State University; Oak Ridge National Laboratory

3:10 PM Invited

Binder Jetting Materials for Energy Applications: Carson Cramer1; Parans Paranthaman1; Hsin Wang1; Kasif Nawaz2; Amy Elliott1; Oak Ridge National Laboratory

3:40 PM Break

4:00 PM Invited

Recent Progress in Testing and Qualification of PM-HIP Alloys for Nuclear Applications: Janelle Wharry1; Michael Pavel2; Zachary Krol1; Esteban Bautista1; Alexander Bullens1; Donna Guillen1; Lucille Giannuzzi2; Elizabeth Getto1; Darren Pagan1; Paula Freyer2; David Gandy2; Purdue University; University of California State University - Northridge; Idaho National Laboratory; LA Giannuzzi & Associates; US Naval Academy; Cornell University; Westinghouse Electric Company, LLC; Electric Power Research Institute

4:30 PM

Design for Additive Manufacturing of a Novel Heat Exchanger: Adrian Sabau1; Bart Murphy2; Keith Carver1; Frederick List1; Yoram Polsky1; Oak Ridge National Laboratory

4:50 PM

Thermoelectric Higher Manganese Silicide: Synthesized, Sintered and Shaped Simultaneously by Selective Laser Sintering/ melting Additive Manufacturing Technique: Yohann Thimont1; Lionel Presmanes2; Vincent Baylac3; Philippe Tailhades2; David Berthebaud1; Franck Gascoin3; CITRAMAT; Laboratoire CIRIMAT UMR 6508 CNRS ENSICAEN

5:10 PM

Laser Additive Manufacturing of Thermoelectric Materials: Haidong Zhang1; Panagiotis Rammou2; Saniya LeBlanc2; George Washington University

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing of Metals: Fatigue and Fracture III — Session II

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Nikolas Hrabe, National Institute of Standards and Technology - Boulder; Steve Daniewicz, University of Alabama; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Tuesday PM | March 12, 2019**

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**Session Chair:** Mohsen Seifi, ASTM International

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2:00 PM Invited

Criticality of Porosity Defects on the Fatigue Life of Wire • Arc Additive Manufactured Titanium Alloy: Xiang Zhang1; Coventry University

2:30 PM

Effect of the Surface Finish on the Cyclic Behavior of Additively Manufactured AISI1045: Matilde Scurria1; Benjamin Möller1; Rainer Wagener2; Tobias Metz2; TU Darmstadt; Fraunhofer Institute for Structural Durability and System Reliability LBF

2:50 PM

The Relationship of Processing Parameters to Surface Roughness and Fatigue Life in Additive Manufacturing: Joy Goche1; Luke Sheridan1; Bo Whip1; Eric Tatman1; Britannie Koerper1; Wright State University

3:10 PM

Effect of Heat Treatments on Fatigue Properties of Ti-6Al-4V and 316L Produced by Laser Powder Bed Fusion in a Built Surface Condition: Antonio Cutolo1; Chola Elangeswaran1; Charlotte de Formanoir1; Gokula Muralidharan1; Brecht Van Hooreweder1; KU Leuven; 3D Systems

3:30 PM Break

3:50 PM Invited

Fatigue Crack Growth Properties of Selective Laser Melting Produced Alloy 718 at Ambient and Elevated Temperatures: Jamie Kruzic1; Halsey Ostergaard1; UNSW Sydney

4:20 PM

The Effects of Microstructure and Material Length Scales on the Fatigue Crack Growth Rates for Thin Wall Additive Manufactured Components: Richard Russell1; Jacob Hochhalter2; David Dawicke3; Edward Gaessgen1; Douglas Wells1; NASA; University of Utah; Analytical Services and Materials, Inc.

4:40 PM

Fatigue Crack Initiation and Growth Behavior in Additively Manufactured 17-4 PH Stainless Steel: Pooriya Darstranj Nazhadfar1; Shuai Shao2; Steve Daniewicz2; Nam Phan1; Nima Shamsaei1; Auburn University; Louisiana State University; University of Alabama; U.S. Naval Air System Command (NAVAIR)

5:00 PM

The Effects of Powder Recycling on the Mechanical Properties of Additively Manufactured Materials: Arash Soltan-Tehrani1; Jonathan Pegues1; Jaikp Mallory1; John Robertson2; Ramesh Ramakrishnan3; Mohsen Seifi1; Nima Shamsaei1; Auburn University; Delta Air Lines, Inc.; Delta Air Lines, Inc.; Case Western Reserve University/ASTM International
ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ni-based Systems II

Sponsored by: TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

Program Organizers: Biji-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday PM | March 12, 2019
221C | Henry B. Gonzalez Convention Center

Session Chairs: Chantal Sudbrack, QuesTek Innovations, LLC; Gerhard Fuchs, University of Florida

2:00 PM Invited
The Microstructural Evolution of CM247LC Manufactured through Selective Laser Melting: Katerina Christofidou1; Nick Jones1; Ed Pickering2; Yogiraj Pardhi2; Neil Jones2; Howard Stone2; *University of Cambridge; *University of Manchester; *Rolls-Royce plc

2:30 PM
Influence of Different Heat Treatments on the Microstructure and Mechanical Properties of Additively Manufactured IN718: Benedikt Diepold1; Martin Pröstle1; Steffen Neumeier1; Mathias Göken1; Friedrich-Alexander University Erlangen-Nürnberg

2:50 PM
Integrated Computational Modeling of Selective Laser Melting of Inconel 718: Kubra Karayagiız1; Luke Johnson1; Mohammad Mahmoudi1; Hannah Boon1; Alaa Elwany1; Ji Ma1; Ibrahim Karaman1; Raymundo Arroyave1; 1Texas A&M University

3:10 PM
Microstructural Response to Heat Treatment of Blown Powder Inconel 625: Myles Fullen1; Judy Schneider1; Paul Gradl2; 1University of Alabama at Huntsville; 2NASA Marshall Space Flight Center

3:30 PM Break

3:50 PM
The Effects of Heat Treatments on Microstructure, Texture, and Mechanical Properties Evolution in IN718 Cubes Additively Manufactured by Laser Powder Bed Fusion: Runbo Jiang1; Anthony Rollett1; 1Carnegie Mellon University

4:10 PM
How Dependent are the Microstructure Evolutions of AM Alloys on the Local Geometry and Thermal Conditions of the Build?: Fan Zhang1; Lyle Levine1; Mark Stoudt1; Carylyn Campbell1; Andrew Allen1; 1National Institute of Standards and Technology

4:30 PM
Microstructure and Mechanical Response of SLM IN718 Printed under Ar, N2, He Gases: Glenn Bean1; David Witkin1; Tait McMoulth1; Dhruv Patel1; Rafael Zaidivar2; 1The Aerospace Corporation

4:50 PM
Quantifying Bimetallic Joints Formed Using Directed Energy Deposition Processes: Jordan Terrell1; Judy Schneider1; Paul Gradl2; 1University of Alabama at Huntsville; 2NASA Marshall Space Flight Center

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Fundamentals in Alloy Design for AM II

Sponsored by: TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Sal. Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Tuesday PM | March 12, 2019
221D | Henry B. Gonzalez Convention Center

Session Chairs: Orlando Rios, Oak Ridge National Laboratory; Ida Berglund, QuesTek Innovations

2:00 PM Invited
Nanostructured Metal Parts through Green Body 3D Printing and Sintering: Christopher Schuh1; 1Massachusetts Institute of Technology

2:30 PM
Coupling the Calculation of Phase Diagrams and Machine Learning to Search for printable Alloys: Minh-Son Pham1; 1Imperial College London

2:50 PM
Additive Manufacturing of Aluminum Alloys from Multiple Series Via Nanofunctionalization: Julie Miller1; Brennan Yahata1; Randall Schubert1; John Martin1; Jacob Hundley1; 1Hrl Laboratories, Llc

3:10 PM Invited
Data-driven Design of Alloys for Additive Manufacturing: Bryce Meredith1; 1Citrine Informatics

3:40 PM Break

4:00 PM
Progress of Developing Addalloy™, High-performance Aluminum Alloys for Additive Manufacturing: Joe Croteau1; Seth Griffiths1; Christian Leinenbach1; David Seidman1; David Dunand1; Nhon Vo1; 1NanoAl LLC; 1Empa; 1Northwestern University

4:20 PM
3D Printed Ultrastrong and Ultratough Metallic Architectures: Wen Chen1; Cheng Zhu1; Thomas Voisin1; Scott McCall1; Andrew Pascall1; Joshua Kuntz2; Eric Duoss2; Christopher Spadaccini2; 1University of Massachusetts, Amherst; 2Lawrence Livermore National Laboratory

4:40 PM
Additive Manufacturing of 304 Stainless Steel Oxide Dispersion Alloy via Selective Laser Melting: Milad Ghayoor1; Kijoon Lee1; Yujuan He2; Chih-hung Chang3; Brian K. Paul1; Somayeh Pasebani1; 1School of Mechanical, Industrial and Manufacturing Engineering, Oregon State University; 2School of Chemical, Biological, and Environmental Engineering, Oregon State University; 3Carnegie Mellon University
CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session IV

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

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302A | Henry B. Gonzalez Convention Center

Session Chairs: Daniel Coughlin, Los Alamos National Laboratory; Daniel Savage, University Of New Hampshire

2:00 PM
3D Observation of Plastic Slip Localization in a Ti-7Al Alloy Using X-ray Topotomography: Patrick Callahan1; Jean Steinville1; Aude Mulard1; Wolfgang Ludwig4; Henry Proudhon3; Tresa Pollock1; 1University of California Santa Barbara; 2Safran; 3MATEIS, INSA Lyon; 4MINES ParisTech

2:20 PM
The Shear Response of Beryllium as a Function of Temperature and Strain Rate: Carl Cady1; Cheng1; Carl Trujillo1; George Gray1; 1Los Alamos National Laboratory

2:40 PM
Discerning Multiaxial Stress Gradients Using High Energy X-rays and Finite Elements: Christopher Budrow1; Matt Miller1; Paul Dawson1; 1Cornell University

3:00 PM
Micro-cantilever Tests of Asymmetry in Tensile and Compressive Slip Properties in Alpha Titanium: Jicheng Gong1; Angus Wilkinson1; 1University of Oxford

3:20 PM
Cold Creep of Ti Alloys: In Situ Synchrotron Diffraction and Crystal Plasticity Finite Element Analysis: Yi Xiong1; Phani Karamched1; Chi-Toan Nguyen1; Christopher Magazenzi1; David Collins3; Edmund Tarleton1; Angus Wilkinson1; 1University of Oxford; 2University of Manchester; 3University of Birmingham

3:40 PM Break

4:00 PM
Effect of Microtextured Regions on the Early Plastic Deformation of Ti-6Al-4V: EVP-FFT Simulations of Realistic Polycrystals Reconstructed Using 3D EBSD: Samuel Hemery1; Azdine Nait-Alif1; Mikael Gueguen1; Joseph Wendorf1; McLean Echlin1; Jean-Charles Stinville1; Tresa Pollock1; Patrick Villetchaise1; 1Pprime Institute - ENSMA; 2Pprime Institute - CNRS; 3University of California, Santa Barbara

4:20 PM
A New Mechanism of Strain Transfer in Polycrystals: Fabio Di Gioacchino1; Thomas Edwards2; Garth Wells3; William Clegg1; 1Department of Materials Science and Metallurgy, University of Cambridge; 2EMPA – Swiss Federal Laboratories for Materials Science and Technology; 3Department of Engineering, University of Cambridge

4:40 PM
In Situ X-ray Diffraction and High-resolution DIC of a High Work-hardening Ti-6Al-4V Prepared by Electron-beam Melting: Kari Sofnokski1; Solange Vives1; Charlotte De Formanoir2; Ivo Kubena3; Steven Van Petegem1; Stéphane Godet2; Helena Van Swygenhoven1; 1Paul Scherrer Institute; 2Université Libre de Bruxelles; 3Academy of Sciences of the Czech Republic

5:00 PM
Effect of Basal Precipitates on Non-basal Deformation Mechanisms: A Micro-compression Study of Single Crystal Mg-9Al (wt%) Pillars: Xiaolong Ma1; Quan Jiao2; Laszlo Kecskes1; Jaafar El-Awady1; Timothy Weihs1; 1Johns Hopkins University

5:20 PM
Microstructure and Deformation Behavior of CP Titanium with Different Oxygen Contents: Joo-Hee Kang1; Jun-Yeol Chae2; Ji Hoon Kim2; Eun-Young Kim1; Chan Hee Park2; Chang-Seok Oh2; 1Korea Institute of Materials Science; 2Pusan National University

ADVANCED MATERIALS

Advanced High-Strength Steels III — Microstructure, Processing, and Properties of Advanced High-Strength Steels II

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

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Session Chairs: Joseph McDermid, McMaster University; Virginia Judge, Colorado School of Mines

2:00 PM
Effect of Electrode Degradation on Liquid Metal Embrittlement Cracking in Resistance Spot welding of Advanced High Strength Steels: Kaisar Mahmud1; Siva Prasad Murugan2; Yeongdo Park2; 1Dong-Eui University

2:20 PM
Microscale Observations of Liquid Metal Embrittlement in TRIP Steels: Daniel Massie1; Mark Barkey1; Benjamin Hilpert1; Holger Schubert1; Luke Brewer1; 1University of Alabama; 2TecFabrik Daimler AG

2:40 PM
Effect of Intercritical Annealing Parameters and Surface Active Element (Sn) Addition on the Mechanical Properties of a Medium Mn Third Generation Advanced High Strength Steel: Kazi Mahmudul Haque Bhdohon1; Joseph McDermid1; Frank Goodwin2; 1McMaster University; 2International Zinc Association

3:00 PM
Atomistic and First Principles Simulation of Fe/Fe3Al8 System: Kefan Chen1; Bin Li1; 1University of Nevada, Reno

3:20 PM Break

3:40 PM
Cyclic Austenite-to-Ferrite and Ferrite-to-Austenite Phase Transformations in Fe-C-Mn-Si Alloy: Phase-Field and Experimental Studies: Rihito Ikuta1; Akinori Yamanaka1; Takahiko Kohtake2; Masahito Segawa3; 1Tokyo University of Agriculture and Technology; 2Nippon Steel & Sumitomo Metal Corporation; 3ITOUCHU Techno-Solutions Corporation
4:00 PM Invited
Stabilizing Austenite via a Core-Shell Structure in the Medium Mn Steel: Xinhao Wan1; Hao Chen1; Zhigang Yang1; Chi Zhang1; 1Tsinghua University

4:20 PM
The Influence of Multi-step Partitioning on the Microstructure and Mechanical Properties of High Strength-hight Ductility Medium-manganese Steels: Kun Li1; Bing Yu2; S. Liu1; R.D.K. Misra2; 1UTEP; 2Shanghai Jiatong University

4:40 PM Invited
Laser Additive Manufacturing of Magnetic Materials: Kushar Borkar1; Raj Banerjee2; Raju Ramanujan3; 1Cleveland State University; 2University of North Texas; 3Nanyang Technological University

5:10 PM Invited
Production of Highly Coercive Net Shape Magnets with Additive Manufacturing: Scott McColl1; Alexander Baker1; Sarah Baker1; Matthew Worthington1; Joshua Kuntzq1; Christine Orme1; Lawrence Livermore National Laboratories

ELECTRONIC MATERIALS
Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — 3D Microelectronic Packaging and Emerging Interconnects I

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourtay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Anf Safari, Universiti Malaysia Perlis

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216A | Henry B. Gonzalez Convention Center

Session Chairs: Albert Wu, National Central University; Won-Sik Hong, Korea Electronics Technology Institute (KETI)

2:00 PM Invited
A Novel Joining Process for the Die-attachment of Next-generation Power Devices: Hao Zhang1; Seungjun Noh2; Zhi-quan Liu2; Caifu Li3; Norio Asatani1; Yukiharu Kimoto1; Aiji Suetake1; Shijo Nagao1; Tohru Sugahara1; Katsuki Suganuma1; 1The Institute of Scientific and Industrial Research, Osaka University; 2Institute of Metal Research, Chinese Academy of Sciences

2:30 PM
A Study on Electrical Conductivity of Micro Friction Stir Welded Dissimilar Sheets for Hybrid Electric Vehicles (HEVs): Omkar Mypati1; Sujya Pal1; Prakash Sriniram2; 1IIT Kharagpur; 2Warwick Manufacturing Group

2:50 PM
Multi-phase-field Modeling for Next-generation Interconnect Devices Based on TSVs: Vahid Attar1; Raymundo Arroyave2; Zachary Morgan3; Yungmei Jin4; 1Texas A&M University; 2Michigan Technological University

3:10 PM
Kinetic Monte Carlo Model for Improved Electroplating of TSVs in 3DIC: Bharathi Srinivasan2; 1Institute of High Performance Computing

3:30 PM Break

3:50 PM
Additive Manufacturing of Soft Magnetic Supermalloys: Srinivas Aditya Mantri1; Sriraoop Dasari1; Varun Chaudhary1; Raju Ramanujan1; Rajarshi Banerjee1; 1University of North Texas; 2Nanyang Technological University

4:10 PM Invited
Low Resistance Cu-to-Cu Joints using Highly <111>-Oriented Nanowinned Copper: Kai Cheng Shie1; Jing-Ye Juang2; Shih-Yang Chang3; Chii Chen1; 1National Chiao Tung University

4:40 PM Invited
Exploring Processing Parameters for Soft Magnetic Composites Fabricated by Additive Manufacturing: Mitra Taheri1; 1Drexel University

TECHNICAL PROGRAM
4:30 PM
Low Temperature Cu-to-Cu Direct Bonding with Thin Gold Capping on Highly <111>-Orientated Nanotwinned Cu Films: Yu-Ting Wu; Chih Chen; National Chiao Tung University

4:50 PM
Electrodeposition of Large-scale Nanotwinned Copper Pillar within through Silicon via: Zhi-Quan Liu; Fu-Long Sun; Institute of Metal Research, Cas

CHARACTERIZATION

Advanced Real Time Imaging — Iron and Steelmaking II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinchiro Nakano, US Department of Energy; National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongqi Sun, BlueScope Ltd.; Hamed Abdeyazdan; Egyptian Academy for Scientific Research and Technology; John Garcia; School of Materials Science and Engineering, Georgia Institute of Technology; 2:00 PM Invited

Observation of Crystallization Behavior for Silicate Supercooled Liquids on Metallic Substrates under Different Oxygen Partial Pressure: Sohei Sakenaga; Masanori Tashiro; Hiroyuki Shibata; ‘IMRAM, Tohoku University

2:30 PM Invited
Observation of the Reaction between Iron Ore and Metallurgical Fluxes for Improved Pre-reduction: J Whiston; Stephen Spooner; K Meijer; Z. Li; ‘WMG, University of Warwick; ‘Tata Steel Europe

3:00 PM
In Situ Observation of Initial Stages of Oxide-scale Formation on Steel at 1150°C: Ming Zhong; Yining He; Elyce Milligan; Chris Pistorius; Bryan Webler; ‘Carnegie Mellon University

3:20 PM Invited
In Situ Observation of Non-metallic Inclusions in the System Steel slag- refractory: Set-up, Limitations and Results: Susanne Michelic; Uxia Dieguez Salgado; Christian Bernhardt; ‘Montanuniversitaet Leoben

3:50 PM Break

4:10 PM
In Situ Study on the Transformation Behavior of Ti-bearing Slags in the Oxidation Atmosphere: Yongqi Sun; Zuotai Zhang; ‘University of Queensland; ‘Southern University of Science and Technology

4:30 PM
Dissolution of Sapphire and Alumina-magnesia Particles in CaO-SiO2-Al2O3 Liquid Slags: Hamed Abdeyazdan; Neslihan Dogan; Raymond Longbottom; M Akbar Rahmadhani; Michael Chapman; Brian Monaghan; ‘University of Wollongong; ‘McMaster University; ‘Swinburne University of Technology; ‘BlueScope Ltd.

MATERIALS PROCESSING

Advances in Surface Engineering — Session IV

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Tuesday PM | March 12, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Sandip Harimkar, Oklahoma State University; Dong Lin, Kansas State University

2:00 PM
Microstructural Analysis of Aluminum-Molybdenum Surface Compositions by Friction Stir Processing: Mahesh P; Amit Arora; Indian Institute of Technology, Gandhinagar

2:20 PM
Surface Chemistry after Spot-by-spot Laser-interference Processing of AA 5128 Alloy: Adrian Sabau; Meyer Harry; Claus Daniel; ‘Oak Ridge National Laboratory

2:40 PM
Determining Conditions and Mechanisms for Barium Desorption from Scandate Cathode Surfaces: Mujan Seif; Thomas Balk; Matthew Beck; ‘University of Kentucky

3:00 PM
Dry Sheet Metal Forming Through Selective Oxidized Tool Surfaces: Bernd-Arno Behrens; Deniz Yilkiran; Simon Schöler; Sven Hübner; Kai Möhwald; Fahrettin Özkaya; ‘Leibniz University Hannover

3:20 PM
Effect of Process Parameters on Surface Properties of Laser Hardened Cast Iron: Santosh Wagh; Sudeep Ingole; Dhananjay Bhatt; Jyoti Menghani; M Rathod; ‘S V National Institute of Technology; ‘Always Avant; ‘College of Engineering, Pune

3:40 PM Break

4:00 PM
Characterization of Deposits on Oil-refining Process Equipment: John Garcia; William McCaffrey; John Nychka; ‘University of Alberta

4:20 PM

4:40 PM
On Improvement in Surface Integrity of µ-EDMed Ti-6Al-4V Alloy by µ-ECM Process: Ramver Singh; Akshay Dvivedi; Pradeep Kumar; ‘Indian Institute of Technology, Roorkee
MATERIALS DESIGN
Algorithm Development in Materials Science and Engineering — Computational, Experimental, and Machine Learning Algorithms in Study and Design of Materials II


Program Organizers: Mohsen Asie Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Sriviliputhur, University of North Texas

Tuesday PM | March 12, 2019
304A | Henry B. Gonzalez Convention Center

Session Chair: Charudatta Phatak, Argonne National Laboratory

2:00 PM
Video Games & Crowd Sourcing: Algorithm Development for Materials Design: Christopher Adair; Alexandre Bradford; Michael McCullough; Jedediah Lion; Seth Holladay; Derek Hansen; Oliver Johnson; Brigham Young University

2:20 PM
Validation of High-resolution Calculations to Inform Continuum Model Development: Garry Maskaly; Donald Sandoval; Elias Clark; Los Alamos National Laboratory

2:40 PM
Predictions of Field Fluctuations in Heterogeneous Materials: Miroslav Zecevic; Ricardo Lebensohn; Los Alamos National Laboratory

3:00 PM
Spectral Homogenization Modeling of Heterogeneous Materials: Aitor Cruzado; Javier Segurado; Amine Benzerga; Texas A&M University; Technical University of Madrid

3:20 PM Break

3:50 PM
Identify Rare Atomic-Scale Events Using Machine Learning on Mesoscale Data: Philip Goins; Brian DeCost; Efrain Hernandez-Rivera; Army Research Laboratory; National Institute of Standards and Technology

4:10 PM
U-SLADS: Unsupervised Learning Approach For Dynamic Dendrite Sampling: Nicola Ferrier; Yan Zhang; Xiang Huang; Emine Gulsoy; Charudatta Phatak; Argonne National Laboratory; Northwestern University

4:30 PM
Automated Algorithm for Quantifying Nanoscale Precipitates in Superalloy 718 using High-Resolution SEM Imaging: Nishan Senanayake; Timothy Smith; Peter Bonacuse; Richard Rogers; Jennifer Carter; Case Western Reserve University; NASA Glenn Research Center

4:50 PM
Quantitative Electron Diffraction Simulations of Quasicrystals: Comparison with Experiments and Approximant Phases: Saransh Singh; Marc De Graef; Carnegie Mellon University

ELECTRONIC MATERIALS
Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session IV

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensciena University of Caen; Soon-Jik Hong, Kongju National University; Philippe Juncl, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Tuesday PM | March 12, 2019
216B | Henry B. Gonzalez Convention Center

Session Chairs: Hsin-jay Wu, National Sun Yat-sen University; Franck Gascoin, Ensienia University of Caen

2:00 PM Invited
Exploratory Research Project “Conpothe”: Achievements and Thoughts: Franch Gascoin; Stefan Maier; Robin Lefevre; Crismat Cns; Aachen University; Aarhus University

2:20 PM Invited
TiNiSn-based High-Entropy Thermoelectrics with High ZT-1.5: Peter Rogl; Matthias Guerth; Philipp Saueressig; Jan Vrestal; Vitaly Romaka; Gerda Rogl; Andrij Grytsiv; Kunio Yubuta; Ernst Bauer; Universitaet Wien; Masaryk University; Liv Polytechnic National University; Christian Doppler Laboratory for Thermoelectricity Vienna; Tohoku University; TU-Wien

2:40 PM Invited
Superior Thermoelectric Performance of n-type Mg3Sb2-Mg3Bi2 Alloys Materials for Low-mid Temperature: G. Jeffrey Snyder; Kazuki Imasato; Northwestern University

3:00 PM
Thermal Superinsulating Materials with Integrated Thermoelectric Properties: Jerome Guazzagalloppo; Cedric Hulilet; Fabrice Chopard; Philippe Jund; Montpellier University; Hutchinson

3:20 PM Invited
High Thermoelectric Figure-of-merit in In-doped ß-Zn4Sb3: Hsin-Jay Wu; Hui-Yi Su; National Sun Yat-sen University

3:40 PM Break

4:00 PM Invited
Prospective Cryogenic Temperature Thermoelectric Materials: BiSb Alloys: Joseph Poore; University Of Virginia

4:20 PM
HPT Processing, a New Way to Produce High ZT Skutterudites: Gerda Rogl; Andrij Grytsiv; Michael Zehetbauer; Ernst Bauer; Peter Rogl; CDL University Vienna Austria; CDL.TU Wien; University Vienna

4:40 PM
Custom Pyrolytic Graphite-steel Thermocouple for High Temperature Measurements: Abdul-Sommed Hadi; Bryce Hill; Montana Technical University; Montana Technological University

5:00 PM
Thermal Stability of Doped CoSb3 based Skutterudites: Pavel Broz; Frantisek Zelenka; Jan Vrestal; Jiri Bursik; Gerda Rogl; Peter Rogl; Masaryk University, CEITEC MU; Institute of Physics of Materials, Czech Academy of Sciences; Institute of Materials Chemistry, University of Vienna
LIGHT METALS

Aluminum Alloys, Processing and Characterization — Behavior of Casting Alloys

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

Tuesday PM | March 12, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: X. Grant Chen, Department of Applied Sciences, Université du Québec à Chicoutimi

2:00 PM Invited Study on Tensile Behavior of High Vacuum Die-cast AlSiMgMn Alloys: Haidong Zhao1; Fei Liu1; Chen Hu1; Runsheng Yang1; Fengzhen Sun1; 1South China University of Technology; 2Imperial College London

2:30 PM The Effect of Manganese and Strontium on Iron Intermetallics in Recycled Al-7% Si Alloy: James Mathew1; Prakash Sirirangam1; 1WMG

2:55 PM The Effect of Thermo-mechanical Processing on the Microstructure and Mechanical Properties of Modified SIMA Treated Al-7Si Alloy: Chandan Choudhary1; Durbadal Mandal1; Kanai Lal Sahoo2; 1NIT Durgapur; 2CSIR-NML, Jamshedpur

3:20 PM Elevated-temperature Low Cycle Fatigue Behaviors of Al-Si 356 and 319 Foundry Alloys: S. Chen1; Kun Liu1; X. G. Chen1; 1University of Quebec at Chicoutimi

3:45 PM Break

4:00 PM High Conductivity AlSi7Mg (A356) Alloys – Market, Production, Optimization and Development: Takeshi Saito1; Petter Åsholt1; Leonhard Heusler1; Thomas Balkenhol1; Kjetil Steen1; 1Hydro Aluminium

4:25 PM Die-casting and Recyclability of LREE Aluminum-Cerium Alloys: Zachary Sims1; Hunter Henderson2; David Weiss3; Michael Thompson3; Michael Kessler4; Ryan Ott4; Fanqiang Meng4; Eric Stromme5; Sam Kassoumeh6; James Evangelista6; Gerald Begley6; Orlando Rios7; Ananth Iyer7; Heejong Lim7; 1University of Tennessee; 2Oak Ridge National Laboratory; 3Eck Industries; 4Ages National Laboratory; 5U.S. Navy; 6Shiloh Industries; 7Tennessee Tooling and Engineering; 8Purdue University; 9University of Seoul

4:50 PM Influence of Die Soldering on Die Erosion and Soldering Layer between Al Melts and Die in Al-Si-Fe Alloys: Jong Min Kim1; Jeong IL Youn2; Young Jig Kim3; 1Sungkyunkwan University

5:15 PM Concluding Comments
CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — High-entropy Alloys and Nuclear Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

**Tuesday PM | March 12, 2019
303A | Henry B. Gonzalez Convention Center
Session Chairs:** Arun Devaraj, Pacific Northwest National Laboratory; Haiming Wen, Missouri University of Science & Technology

2:00 PM Invited
Coupled Atom Probe Tomography – Transmission Electron Microscopy Investigation of Microstructural Inversion in a Refractory High Entropy Alloy: Vishal Soni1; Talukder Alam2; Bharat Gwalani3; Oleg Senkov3; Daniel Miracle4; Rajarshi Banerjee5

2:35 PM
APT Characterization of Irradiation-induced Segregation and Precipitation in AlxCrCoFeNi High Entropy Alloys: Tengfei Yang1; Wei Guo1; Jonathan Poplawsky2; Rong Hu3; Gang Sha4; Dongyue Li5; Songqin Xia5; Yang Zhang5; Yugang Wang5; Steven Zinkle6; University of Tennessee; Oak Ridge National Laboratory; Nanjing University of Science and Technology; University of North Texas; UES Inc; Air Force Research Laboratory

2:55 PM
Effects of Severe Plastic Deformation and Irradiation on Segregation and Precipitation in Ultrafine-grained Steels Studied Using Atom-probe Tomography: Andrew Hoffman1; Haiming Wen1; Missouri University of Science & Technology

3:15 PM
Analysis of Hydrogen Isotopes in Zircalloy-4 Using Atom Probe Tomography: Arun Devaraj1; Elizabeth Kautz2; Daniel Perea3; Bruce Arey4; John Hardy5; Bradley Johnson6; David Senor7; Pacific Northwest National Laboratory

3:35 PM Break

3:55 PM Invited
Atomic Scale Analysis of Grain Boundary Deuteride Growth Front in Zircaloy-4: A.J. Breen1; I. Moutou1; W. Lu2; Siyang Wang3; A. Szczepaniak1; P. Kontis1; L.T. Stephenson1; A.K. da Silva1; C. Liebscher1; D Raabe1; Thomas Britton1; M. Herbrig1; Baptiste Gault1; Max-Planck-Institut für Eisenforschung; Imperial College London

4:30 PM
APT and STEM Analysis of a Metallic Nuclear Fuel to Reveal the Influence of Thermomechanical Processing on Their Microstructural Evolution: Arun Devaraj1; Elizabeth Kautz2; Libor Kovarik3; Saumyadeep Jana4; Curt Lavender4; Vineet Joshi5; Pacific Northwest National Laboratory

4:50 PM Invited
Using Atom Probe Tomography to Understand Neutron Irradiated Effects in High Temperature Superconductors for Nuclear Fusion Applications: Philip Edmondson1; Oak Ridge National Laboratory

BIOMATERIALS

Biological Materials Science — Bioenabled Materials and Systems

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

**Tuesday PM | March 12, 2019
217A | Henry B. Gonzalez Convention Center
Session Chairs:** David Restrepo, University of Texas San Antonio; Jing Du, Penn State University

2:00 PM Keynote
Functional Hybrid Material Systems Designed by Guided Biofabrication: Candan Tamerler1; University of Kansas

2:40 PM
A Nacre-like Glass that Surpasses the Impact Resistance of Tempered Glass: Zhen Yin1; Florent Hannard2; Francois Barthelat3; McGill University; McGill University

3:00 PM
Nanoscale Toughening Mechanisms in the Cell Walls of Wood: Holger Militz1; Cynthia Volker1; University of Goettingen

3:20 PM
Discrete Element Models of Crack Propagation and Toughness in Idealized, Enamel-inspired Composites: John Pro1; Francois Barthelat2; McGill University

3:40 PM Break

4:00 PM Invited
Using Biomimeralization Routes to Build Cancer Testbeds: Kolpano Katti1; MD Shahjahan Molla2; Sumanta Kar3; Dinesh Katti4; North Dakota State University

4:30 PM
In Vivo Evaluation of Electrochemically Deposited Collagen Biomaterial for Soft Tissue Healing: Xingguo Cheng1; Southwest Research Institute

4:50 PM
Processing of a Formable Bioactive Glass Composite for Bone Tissue Scaffolding: Caitlin Guzzo1; John Nychka1; University of Alberta

5:10 PM
3D Printed Nanocomposite for Interstitial Hyperthermia of Cancer Cells: Kwabena Kan-Dapaah1; John Obayemi2; Ali Salifu3; Nima Rahbar4; Wole Soboyejo5; University Of Ghana; Worcester Polytechnic Institute
ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Mechanical Properties

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Tuesday PM | March 12, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Takeshi Egami, The University of Tennessee, Knoxville; Frans Spaepen, Harvard University

2:00 PM Keynote
Why Liquid Becomes Glass? Takeshi Egami1; 1University of Tennessee

2:30 PM Invited
Two-way Tuning of Structural Order in Metallic Glasses: Qiaooshi Zeng1; 1Hpstar

2:50 PM Invited
High Pressure Quenched Metallic Glasses: Wójciech Dmowski1; 1University of Illinois; Stanisław Gierlotka1; 1University of California; Yoishikio Yokoyama1; 1University of Tennessee; Takeshi Egami1; 1University of Tennessee; Bernd Gludovatz1; 1University of New South Wales

3:10 PM Invited
The High-Iron Content Fe-based Amorphous Alloys with Good Soft Magnetic Property: Ke-Fu Yao1; 1Li-Ji Jia; 1Ling-xiang Shi; 1Jinfeng Li1; 1Tsinghua University

3:30 PM Break

3:50 PM Keynote
On the Fracture Toughness of Bulk-metallic Glasses: Robert Ritchie1; 1University of California; Jun Ding1; 1University of Tennessee; Bernd Gludovatz1; 1University of California; Thomas Pekin1; 1University of New South Wales

4:20 PM Invited
On the Fracture Toughness and Fatigue Strength of Ni-based Glasses: Bernd Gludovatz1; 1University of New South Wales; Edwin Chang1; 1University of California; Mingxi Zheng1; 1University of Tennessee; Sara Messina1; 1Maximilian Launey; 1Marlos Demetriou; 1University of Tennessee; William Johnson1; 1UNSW Sydney; 1University of California, Berkeley; 1Glassimetal; 1Caltech

4:40 PM Invited
In Situ Deformation Behavior of Bulk Metallic Glass Composites at Small Length-scales: Saideep Muskerti1; 1Vahid Hasanbeigi; 1Sundeept Muthjerjee; 1University of North Texas

5:00 PM Invited
Guiding and Deflecting Cracks in Bulk Metallic Glasses to Increase Damage Tolerance: Jun Yi1; 1University of Tennessee; Wei Hua Wang1; 1John Lewandowski; 1University of Tennessee; Maximilian Launey1; 1Maximilian Launey; 1Maximilian Launey; 1University of Tennessee; William Johnson1; 1UNSW Sydney; 1University of California, Berkeley; 1Case Western Reserve University

5:20 PM Invited
Microstructure and Fracture Toughness Evolution a Zr-based Bulk Metallic Glass after Thermomechanical Processing: Jamie Kruzic1; 1University of Tennessee; Bosong Li1; 1Bernd Gludovatz1; 1Anna Cegueira; 1Keita Nomoto; 1Simon Ringer1; 1Shenghui Xie1; 1UNSW Sydney; 1University of Sydney; 1Shenzhen University

5:40 PM
Origin of Anelasticity in Metallic Glasses: Coupling of Intrinsic Energy Dissipation and External Stimuli: Yue Fan1; 1University Of Michigan, Ann Arbor

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Irradiation Effect

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Tuesday PM | March 12, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Thierry Wiss, European Commission; Jian Wang, University of Nebraska

2:00 PM Invited
Effects of Electronic Energy Loss on Irradiation Damage Production and Evolution in Ceramics: William Weber1; 1University of Nebraska; Eva Zarkadoulas1; 1University of Tennessee; 1Oak Ridge National Laboratory

2:30 PM
Strength-suctility-irradiation Tolerance of Nanostructured Fe – Amorphous Ceramic SiOC Composites: Jian Wang1; 1University of Nebraska; Qin Su1; 1Kaisheng Ming1; 1Chao Gu1; 1Michael Nastasi1; 1University of Nebraska–Lincoln

2:50 PM Invited
Defects and Microstructure Evolution in Oxides under Irradiation: Anter El-Azab1; 1Thomas Hochrainer; 1Purdue University; 1Technische Universität Graz

3:20 PM
SiC-SiC Fiber Composites for Accident-tolerant Fuel Applications: Micromechanical Study of Radiation and Temperature Effects: Yashen Zayachuk1; 1David Armstrong1; 1Christian Deck1; 1Peter Hosemann1; 1University of Oxford; 1General Atomics; 1University of California, Berkeley

3:40 PM Break

4:00 PM Invited
Dynamic Structures Resulting from Ion Radiation Interactions with Porous Ceramics: Nathan Madden1; 1Khalid Hattar; 1Jessica Krogstad1; 1University of Illinois, Urbana-Champaign; 1Sandia National Laboratory

4:30 PM
Radiation Damage Studies in Plutonium Containing Ceramics: Thierry Wiss1; 1Oliver Dieste1; 1Emanuele De Bona1; 1Alessandro Benedetti1; 1Ondrej Benes1; 1Jean-Yves Colle; 1Dragos Staicu; 1Rudy Konings1; 1Vincenzo Rondinella1; 1JRC Karlsruhe

4:50 PM
Visualizing Stress Distribution of Irradiated and Corroded SiC Using Nano-mechanical Raman Spectroscopy: Hao Wang1; 1Debashri Mohanty1; 1Vikas Tomar1; 1Purdue University

5:10 PM
Radiation Effects on SiC/SiC Composites for Nuclear Energy Application: Shradha Agarwal1; 1William Weber1; 1University of Tennessee and Oak Ridge National Laboratory
CHARACTERIZATION


Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikmaylies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Tuesday PM | March 12, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Huazhang Zhai, Beijing Institute of Technology; Bowen Li, Michigan Technological University

2:00 PM Introductory Comments

2:05 PM Invited
Microscale Investigation of Fracture Strength in Hot Pressed Silicon Carbide: Daniel Magagnosc1; Brian Schuster1; U.S. Army Research Laboratory

2:25 PM Invited
Preparation and Adsorption Properties of Ultrathin Boron Nitride Nanosheets: Huaizhang Zhai1; Beijing Institute of Technology

2:45 PM Structure, Phase Composition, and Properties of Ceramics Based on AlMgB14, Obtained from Various Powders: Ilija Zhukov1; Pavel Nikitin1; Alexander Vorozhtsov1; Tomsk state university

3:05 PM TEM Observations of the Effect of Boron Content on the Amorphization of Boron Carbide: Ankur Chauhan1; Mark Schafer2; Sisi Xiang1; Kelvin Xie1; Vladislav Domrich1; Richard Haber1; Kevin Hemker1; Johns Hopkins University; Rutgers University; Texas A & M University

3:25 PM Break

3:40 PM Ultra-high Strength Above 10 GPa and Short-range Atomic Order of Amorphous Boron: Jessica Maito1; Gyhuo Song1; Mariel Colby1; Seok-Woo Lee1; University Of Connecticut

4:00 PM Micropillar Compression Study of Plastic Deformation in Silicate Glasses: Shefford Baker1; Zachary Rouse1; Sanjit Bhowmick1; Praveena Manimunda1; Nicole Wiles1; S.A. Syed Asif1; Thomas Wyrobek1; Cornell University; Bruker Nano Surfaces

4:20 PM Macroporous Ceramics Derived from Particle-stabilized Emulsions: Jinhong Li1; Zhiwei Yang1; Xiang Wang1; China University of Geosciences (Beijing)

4:40 PM Thermal Conductivity Measurements of Materials from Insulating Polymer to Highly Conductive Graphite Film: Heng Wang1; Akhan Tleubaev1; Justin Wynn1; Silviu Apostolescu1; Daniele Paganelli1; Louis Waguespack1; Piero Scotto1; TA Instruments

CORROSION

Coatings and Surface Engineering for Environmental Protection — Coatings for Corrosion Protection II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarak, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Tuesday PM | March 12, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

2:00 PM Invited
Design and Performance of REACH-compliant Coating Systems for Aerospace Applications: Weilong Zhang1; Mike Kryzma1; George Zafiris1; United Technologies Research Center

2:40 PM Invited
Recent Innovations in Electrodeposited Coatings: Kevin Sylvester1; Chris Dacko1; Mike Mayo1; Brian Okerberg1; PPG

3:40 PM Break

4:00 PM Corrosion Performance of Polymer Nanocomposite Coatings on Aluminum Alloy in Saline Environment: Junqing Zhang1; Lei Zhang1; Cheng-fu Chen1; University of Alaska Fairbanks

4:20 PM Fabrication and Characterization of Cold Sprayed Coating for Highly Corrosive High Temperature Conditions: Harminder Singh Chouhan1; Guru Nanak Dev University, Regional Campus, Jalandhar, Punjab, India

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — AI-based Investigation of Material Properties II

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

Tuesday PM | March 12, 2019
305 | Henry B. Gonzalez Convention Center

Session Chair: Houlong Zhuang, Arizona State University

2:00 PM Invited
Accelerating Discovery of Compositionally Complex Amorphous Structural Alloys: Apurva Mehta1; SLAC National Accelerator Laboratory
2:30 PM Artificial Intelligent and Simulation Nano Structure of Ceramic: Habibollah Aminirastabi\textsuperscript{1}; Fatemeh Karimidehcheshmeh\textsuperscript{2}; Guoli Ji\textsuperscript{1}; \textsuperscript{1}Xiamen University

2:50 PM Cloud-based Surrogate Models for Composite Materials: Marat Latypov\textsuperscript{1}; Amil Khan\textsuperscript{2}; Christian Lang\textsuperscript{3}; Kristian Kvilekval\textsuperscript{1}; Andrew Polonsky\textsuperscript{1}; McLean Echlin\textsuperscript{1}; Irene Beyerlein\textsuperscript{1}; B.S. Manjunath\textsuperscript{1}; Tresa Pollock\textsuperscript{1}; \textsuperscript{1}University of California, Santa Barbara

3:10 PM Max Phase Thermo-mechanical Approximation via Machine Learning: Daniel Saucedo\textsuperscript{1}; Raymundo Arroyave\textsuperscript{1}; \textsuperscript{1}Texas A&M University

3:30 PM Break

3:50 PM Invited

3:30 PM Break

Machine-learning-aided Design of Metallic Glasses: Logan Ward\textsuperscript{1}; \textsuperscript{1}University of Chicago

4:20 PM Reduced Order Crystal Plasticity Modelling for ICME Using a Machine Learning Approach: Mengfei Yuan\textsuperscript{1}; Sean Paradiso\textsuperscript{2}; Bryce Meredith\textsuperscript{1}; Stephen Niezgoda\textsuperscript{1}; \textsuperscript{1}Ohio State University; \textsuperscript{2}Citrine Informatics

4:40 PM Research Progress in Machine Learning Building Layered Material Model and Predicting Thermoelectric Performance: Lihao Chen\textsuperscript{1}; Ben Xu\textsuperscript{2}; Ke Bi\textsuperscript{3}; \textsuperscript{1}Beijing University of Posts and Telecommunications; \textsuperscript{2}Tsinghua University

5:00 PM Unsupervised Segmentation of Microstructures: Bo Le\textsuperscript{1}; Elizabeth Holml\textsuperscript{1}; \textsuperscript{1}Carnegie Mellon University

MATERIALS DESIGN

Computational Materials Discovery and Design — Computational Methods for Materials Discovery and Design

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Tuesday PM | March 12, 2019
304C | Henry B. Gonzalez Convention Center

Session Chairs: Jeremy Mason, University of California, Davis; Timofey Frolov, Lawrence Livermore National Laboratory

2:00 PM Invited

Learning from Correlations Based on Local Structure: Rare-earth Nickelates Revisited: James Rondinelli\textsuperscript{1}; \textsuperscript{1}Northwestern University

2:20 PM Invited

Materials Informatics for Autonomous Materials Design: Kristofer Reyes\textsuperscript{1}; Krishna Rajan\textsuperscript{1}; \textsuperscript{1}University at Buffalo-State University of New York

2:40 PM Accelerating Hierarchical Materials Discovery and Design through a Combined Machine Learning and Experimental Framework: Grace Gu\textsuperscript{1}; Chun-Teh Chen\textsuperscript{2}; Deon Richmond\textsuperscript{3}; Markus Buehler\textsuperscript{4}; \textsuperscript{1}UC Berkeley; \textsuperscript{2}Massachusetts Institute of Technology

3:00 PM Computational Characterization Using the Local Spectroscopy Data Initiative (LSDI): Shyam Dararlnath\textsuperscript{1}; Sophia Hayes\textsuperscript{2}; Shyue Ong\textsuperscript{3}; Kristin Persson\textsuperscript{4}; \textsuperscript{1}Lawrence Berkeley National Laboratory; \textsuperscript{2}Washington University, St. Louis; \textsuperscript{3}University of California, San Diego

3:20 PM Break

3:40 PM Materials Discovery under Electrochemical Conditions: Mira Todorova\textsuperscript{1}; Sudarsan Suredinalal\textsuperscript{1}; Joerg Neugebauer\textsuperscript{2}; \textsuperscript{1}Mpi Fuer Eisenforschung

4:00 PM A Python-based Toolkit for Material Design: Shengyen Li\textsuperscript{1}; Steven Mate\textsuperscript{2}; Mark Stoudt\textsuperscript{1}; Careyln Campbell\textsuperscript{1}; \textsuperscript{1}National Institute of Standards and Technology

4:20 PM Optimizing Elastic Moduli of the Silicate Glasses through High-throughput Atomistic Modeling and Machine Learning Techniques: Yong-Jie Hu\textsuperscript{1}; Ge Zhao\textsuperscript{2}; Tyler Del Rose\textsuperscript{1}; Liang Qi\textsuperscript{2}; \textsuperscript{1}University of Michigan; \textsuperscript{2}The Pennsylvania State University

4:40 PM Towards an Autonomous Efficient Materials Discovery Framework: An Example of Optimal Experiment Design under Model Uncertainty: Anjana Talapatra\textsuperscript{1}; Shahin Boluki\textsuperscript{2}; Xiaoning Qian\textsuperscript{2}; Raymundo Arroyave\textsuperscript{1}; Edward Dougherty\textsuperscript{2}; \textsuperscript{1}Texas A & M University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Transformations

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory; Kristofer Reyes, UC Berkeley; Texas A&M University; Shyam Dwaraknath, UC Berkeley; Shyue Ong, The Pennsylvania State University

Tuesday PM | March 12, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Damien Tourret, IMDEA Materials; Chad Sinclair, University of British Columbia

2:00 PM Invited

Soft Phonon Modes as a Predictor of Structural Grain Boundary Phase Transformations?: Chad Sinclair\textsuperscript{1}; Louis Hebrard\textsuperscript{2}; \textsuperscript{1}University of British Columbia

2:30 PM Developing Accurate Models of Phase Transformations from First-principles: Anirudh Raju Natarajan\textsuperscript{1}; Anton Van der Ven\textsuperscript{2}; \textsuperscript{1}University of California, Santa Barbara

2:50 PM Atomic-scale Phase Field Investigation of Ordering in Metamagnetic Shape Memory Alloys: Yuhao Wang\textsuperscript{1}; Vahid Attari\textsuperscript{1}; Thien Duong\textsuperscript{1}; Daniel Salas\textsuperscript{1}; Ibrahim Karaman\textsuperscript{1}; Raymundo Arroyave\textsuperscript{1}; \textsuperscript{1}Texas A&M University
3:10 PM Invited
Chemically Heterogeneous Transition Metal Dichalcogenide Monolayers under Strain: Bend, Shuffle, and Slip: Mikiko Haataja1; 1Princeton University

3:40 PM Break

4:00 PM Invited
Modeling Mechanisms in Rapid Solidification Using Structural Phase Field Crystal Theories: Nikolos Provatas1; 1Mcgill University

4:30 PM
Study of Dendrite Growth under Forced Convection in Superalloy Solidification by Multiphase-field Coupled Lattice Boltzmann Method: Cong Yang1, Qingyan Xu1, Baicheng Liu1; 1Tsinghua University

4:50 PM
Phase Transformations in Al Alloys Using Computational Thermodynamic and Kinetic Modeling: Kyle Fitzpatrick-Schmidt1; 1Victor Champagne2, Danielle Cote2; 2Worcester Polytechnic Institute; 2US Army Research Laboratory

5:10 PM
Three-dimensional Modeling of Bubble-dendrite Interactions under Microgravity and Terrestrial Conditions: Seyed Amin Nabavizadeh1, Mohsen Eshraghi1, Sergio Felicelli1; 1University of Akron; 1California State University

5:30 PM
Thermodynamics and Coarsening of Solid Sn in Pb-Sn Liquid Mixtures Using Hybrid Molecular Dynamics and Monte Carlo Simulations: Seyed Alireza Etesami1, Mohamed Laradji1, Ebrahim Asadi1; 1University of Memphis

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Superalloys: Creep

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Tuesday PM | March 12, 2019
301C | Henry B. Gonzalez Convention Center

Session Chairs: Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

2:00 PM Invited
Deformation Processes in γ and γ′ / γ″ Strengthened Ni-Base Superalloys: Michael Mills1; 1Ohio State University

2:30 PM
Deformation Mechanisms of γ and γ″ Precipitates in IN718 Ni-based Superalloys: Longsheng Feng2, Duchao Lv2, Donald McAllister2; 2Michael Mills1; 2Ohio State University; 2Computherm LLC

2:50 PM
Dislocation Core Behavior in Ni-based Superalloys: Anne Marie Tan1; 1Christopher Woodward1; 1Dallas Trinkle1; 1University of Florida; 1U.S. Air Force Research Laboratory; 1University of Illinois at Urbana, Champaign

3:10 PM
Effects of Eta Phase on the High Temperature Creep Behavior of Nimonic 263: Walter Milligan1; 1Ninad Mohale1; 1Paul Sanders1; 1Calvin White1; 1John Shingledecker1; 1Michigan Technological University; 1Electric Power Research Institute

3:30 PM Break

3:50 PM
3D Modeling of Microstructure Evolution in Ni-based Superalloys under Creep Loading: Maeva Cottura1; 1Benoît Appolairre1; 1Alphonse Fine1; 1Yann Le Bouar1; 1Institut Jean Lamour & LEM, Onera, CNRS; 1Institut Jean Lamour; 1LEM, Onera, CNRS

4:10 PM
Role of Lattice Misfit in the Stability of Ni-based Single Crystal Superalloys: A Phase Field Study: Harikrishnan Rajendran1; 1Jean-Briac le Graverend1; 1Texas A&M University

4:30 PM
Probing Creep Deformation Using High Temperature Nanoindentation and Bulk Mechanical Testing: Ashton Egan1; 1Jiashi Miao1; 1Connor Stone1; 1Maryam Ghazisaeid1; 1Yunzhi Wang1; 1Stephen Niezgoda1; 1Michael Mills1; 1Ohio State University

4:50 PM
Deformation Behavior of a Metal-weld Exposed to High-Temperature CO2-rich Environment: Sajedur Akanda1; 1Reyixiati Repukaiti1; 1Kyle Rozman1; 1Ömer Dogan1; 1Jeffrey Hawk1; 1National Energy Technology Laboratory

LIGHT METALS

Electrode Technology for Aluminum Production — Cathodes and Electrode Technology

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Tuesday PM | March 12, 2019
006D | Henry B. Gonzalez Convention Center

Session Chairs: Eirik Hagen, Hydro Aluminium AS, Primary Metal, Technology; Ronald Logan, Sunstone Development

2:00 PM Introductory Comments

2:05 PM
Carbon Cathode Wear in Aluminium Electrolysis Cells: Samuel Senanu1; 1Tor Grande1; 1Arne Petter Ratvik1; 1Zhaohui Wang2; 1Norwegian University of Science and Technology; 1SINTEF Industry

2:30 PM
Observation on the Creep and Cracking of Graphite Cathode in Laboratory Aluminium Electrolysis: Yunfei Lian1; 1Jilai Xue1; 1Cheng Zhang1; 1Xuan Liu1; 1Haipeng Li1; 1University of Science and Technology Beijing

2:55 PM Concluding Comments
## CORROSION

### Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking I

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

**Tuesday PM | March 12, 2019**

214C | Henry B. Gonzalez Convention Center

**Session Chairs:** Gary Was, University of Michigan; Xiaoyuan Lou, Auburn University

**2:00 PM Invited**

Mechanisms Behind Irradiation Assisted Stress Corrosion Cracking: Gary Was1; 1University of Michigan

**2:40 PM**

Crack Growth Rate and Fracture Toughness of Irradiated Austenitic Stainless Steel Weld: Yiren Chen1; Chi Xu2; Yong Yang3; Wei-ying Chen1; Bogdan Alexandreaniu1; Ken Natesan2; Appajosula Rao3; 1Argonne National Laboratory; 2University of Florida; 3U.S. Nuclear Regulatory Commission

**3:00 PM**

Fracture Mechanics-based Study of Stress Corrosion Cracking of SS304 Dry Storage Canister for Spent Nuclear Fuel: Leonard Tjayadi1; Niles Kumar2; K.L. Murty3; 1North Carolina State University; 2University of Alabama

**3:20 PM**

Mechanisms of Mitigating Chloride-Induced Stress Corrosion Cracking in Austenitic Steels by Laser Shock Peening: Xueliang Yang1; Fei Wang1; Leimin Deng1; Chenfei Zhang1; Yongfeng Lu1; Michael Nastasi1; Bai Cui1; 1University of Nebraska, Lincoln

**3:40 PM Break**

**4:00 PM Invited**

Environmental Cracking of Laser-fused Alloys under Non-irradiated and Irradiated Conditions: Xiaoyuan Lou1; Mi Wang2; Miao Song3; Gary Was4; Rebak Raul5; 1Auburn University; 2University of Michigan; 3GE Global Research

**4:40 PM**

Bulk nc-Materials with Tailored Density Enables Design of Retrievable Corrosion Sensors: Ting Chen1; Anuvind Akula1; Ram Shenoy1; Saadedine Tebbali1; Indranil Roy2; 1WellDiver, SET Laboratories; 2WellDiver, UnIPolar Technology

**5:00 PM**

Modelling the Effect of Iodine at Stress Corrosion Crack Tips in Zirconium Using Hybrid Quantum mechanics/molecular Dynamics Simulations: Vlad Podgurschi1; 1Imperial College London

## MECHANICS & STRUCTURAL RELIABILITY

### Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Data-driven Investigations of Fatigue

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

**Tuesday PM | March 12, 2019**

301B | Henry B. Gonzalez Convention Center

**Session Chair:** Ashley Spear, University of Utah

**2:00 PM Keynote**

Materials-specific Machine Learning: Fatigue Modeling and Beyond: Bryce Meredig1; 1Citrine Informatics

**2:40 PM**

A Data-driven Approach to Describe Fatigue Damage Evolution and Crack Initiation in a BCC Steel Microstructure: Ali Riza Durmaz1; Thomas Straub2; Christoph Eberl3; 1Fraunhofer IWM

**3:00 PM Invited**

Uncertainty, Probabilistic, and Statistical Modeling: D. Gary Harlow1; 1Lehigh University

**3:20 PM Break**

**3:40 PM Invited**

Surface Roughness Parameters as Predictive Damage Indices for Crack Initiation and Small Crack Propagation: Jalal Fathi Sola1; Randall Kelton1; Efthathios Meletis1; Haiying Huang1; 1University of Texas, Arlington

**4:00 PM**

Linking Fatigue Probability Distributions to Coupled Microstructure Attributes Surrounding Fatigue Hot-Spots: Adrienne Muth1; Surya Kalidindi1; Adam Pilchak2; Reji John2; David McDowell3; 1Georgia Institute of Technology; 2U.S. Air Force Research Laboratory

**4:20 PM**

Virtual Testing for Fiber Reinforced Composites Coupled with Multimodal NDE Monitoring: Brian Wisner1; Mohammadreza Bahador1; Mira Shehu2; Melvin Mathew2; Harsh Baid3; Frank Abdi3; Antonios Kontsos3; 1Drexel University; 2AlphaSTAR Corporation

**4:40 PM**

Complex 3D Microstructure and Short Crack Growth Correlation by a Surrogate Model in Ti-6Al-4V: Meysam Hassanipour1; Shinta Watanabe1; Kyosuke Hirayama1; Hiroyuki Toda1; Han Li1; Kentaro Uesugi2; Akhisa Takeuchi1; 1Kyushu University
Frontiers of Materials Research: A Decadal Survey — Outputs and Discussion

Sponsored by: TMS: Materials Innovation Committee

Program Organizer: James Warren, National Institute of Standards and Technology

Tuesday PM | March 12, 2019
221D | Henry B. Gonzalez Convention Center

Session Chairs: James Warren, National Institute of Standards and Technology; Kevin Hemker, Johns Hopkins University

12:15 PM Introductory Comments Presenter: James Warren, National Institute of Standards and Technology

12:20 PM Invited Presentation on the Decadal Survey Outputs: Kevin Hemker1; 1Johns Hopkins University

12:40 PM Panel Discussion: Panel Discussion moderated by Steven Zinkle, University of Tennessee. Panelists include: Linda Horton, Department of Energy; Ian Robertson, University of Wisconsin; Linda Sapochak, National Science Foundation; Susan Sinnott, Pennsylvania State University; and Mark Weaver, University of Alabama

ENERGY & ENVIRONMENT


Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Tuesday PM | March 12, 2019
008A | Henry B. Gonzalez Convention Center

Session Chairs: Sergio Monteiro, Military Institute of Engineering. IME; Luis Silva, IME

2:00 PM Introductory Comments

2:05 PM Keynote

Fish Skin: A Natural Inspiration for Novel Materials and Coatings: Adam Drelich1; Jaroslav Drelich1; 1Michigan Technological University

2:45 PM

Mechanical and Morphological Properties of Eucalyptus Fibers: Juliana Soares de Faria1; Felipe Perisse Duarte Lopes2; Carlos Fontes Vieira1; Sergio Neves Monteiro2; 1State University of Northern of Rio de Janeiro

3:05 PM

Optimization of Torrefaction Parameters for Tectona grandis for High Energetic Yields: Jamiu Odusote1; Adekunle Adeleke1; Olumuyiwa Lasode1; Madhurai Malathi1; Dayanand Paswan1; 1University of ilorin; 2CSIR-National Metallurgical Laboratory

3:25 PM Break

3:35 PM

Characterization of Arapaima Fish Scales and Related Reinforced Epoxy Matrix Composites by XRD, EDS and SEM: Wendell Bruno Almeida Bezerra1; Sergio Neves Monteiro1; Michelle Souza Oliveira1; Fabio Da Costa Garcia Filho1; Luana Cristyne Da Cruz Demosthenes1; Luis Carlos da Silva1; 1Military Institute of Engineering

3:55 PM

Plassava Fibers: Morphologic and Spectroscopic Aspects: Fabio Garcia Filho1; Michelle Oliveira1; Luana Demosthenes1; Sergio Monteiro1; Fernanda Luz2; Artur Pereira2; 1Military Institute of Engineering

4:15 PM

Structural Characterization of Fique Fabric Reinforcing Epoxy Matrix Composites by XRD and SEM Analysis: Michelle Oliveira1; Artur Camposo1; Fabio Garcia1; Luana Demosthenes1; Fabio Braga1; Fernanda Luz2; Sergio Monteiro1; 1Military Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Gradient Materials II: Property and Processing

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Wei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huijhan Gao, Brown University; Hyong Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Tuesday PM | March 12, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Suveen Mathaudhu, University of California, Riverside; Bin Yang, University of California, Riverside; Troy Topping, California State University, Sacramento; Somuri Prasad, Sandia National Laboratories

2:00 PM Invited Mechanical Performance and Thermal Stability of Gradient-structured Copper: Sina Shahrezaei1; Suveen Mathaudhu1; 1University of California, Riverside

2:25 PM Characterization and Analysis of Functionally Graded Metallic Plates for Use in Personal Ballistic Protection: Troy Topping1; Samuel Garrison-Terry1; Elizabeth Keys1; 1California State University, Sacramento

2:45 PM Invited Enhanced Stability of Nano-grained Metals below a Critical Size: Xiuyan Li1; K. Lu1; 1Institute of Metal Research C.A.S.

3:10 PM Radiation and Corrosion Resistances of 316LN Austenitic Stainless Steel by Rotationally Accelerated Shot Peening: Bin Yang1; Xudong Chen1; Yuntian Zhu2; Yusheng Li1; 1University of Science and Technology Beijing; 2North Carolina State University; 3Nanjing University of Science and Technology

3:30 PM

Mechanical Properties and Failure Mechanisms of Gradient Nonporous Materials: Paulo Branicio1; 1University of Southern California
3:50 PM Break

4:10 PM Invited
Usual Gradients Leading to Unusual Benefits: Two Case Studies: C. Tasan; S.M.T. Mousavi; Zhiyuan Liang; Dingshun Yan; Jian Lu; Mingxin Huang; Zhejiang University; Chinese Advanced Academy of Sciences; City University of Hong Kong; University of Hong Kong

4:35 PM
The Mechanical Properties Investigation of Gradient Materials Processed by Surface Mechanical Attrition Treatment (SMAT): Xinhuan Zhu; Kunming University of Science & Technology

4:55 PM Invited
Gradient Microstructures in Single Crystals Induced by Sliding Contact: Somur Prasad; Joseph Michael; Corbett Battaile; Bhaskar Majumdar; Sandia National Laboratories; New Mexico Institute of Technology

5:20 PM
Plastic Deformation Behavior of Laser-processed Nanoscale Al-Al2Cu Eutectic Alloy: Shujuan Wang; Guisen Liu; Qing Su; Dongyue Xie; Gu Chao; Jian Wang; Amit Misra; Los Alamos National Laboratory; University of Nebraska; University of Michigan

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Development and Applications II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Tuesday PM | March 12, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Carl Koch, North Carolina State University; Robert Ritchie, University of California

2:00 PM Keynote
Low Density High Entropy Alloys: A Review: Carl Koch; North Carolina State University

2:30 PM Keynote
Damage-tolerance in CrCoNi-based Medium/High-entropy Alloys: Robert Ritchie; Jun Ding; Mark Asta; Bernd Gludovatz; Easo George; Qian Yu; University of California; Lawrence Berkeley National Laboratory; University of New South Wales; Oak Ridge National Laboratory; Zhejiang University

3:00 PM Invited
High-throughput Materials Design Using CALPHAD-based Informatics Tools: Chuan Zhang; Fan Zhang; Rui Feng; Michael Gao; Peter Liaw; Computherm LLC; University of Tennessee; National Energy Technology Laboratory

3:20 PM Invited
ICME Design of a Corrosion Resistant HEA for Harsh Environments: Pin Lu; James Saal; Greg Olson; Tianshu Li; Orion Swanson; Gerald Frankel; Angela Gerard; Kathleen Quimbaa; John Scully; QuesTek Innovations; The Ohio State University; University of Virginia

3:40 PM Break

4:00 PM
Design of Advanced Light-weight High-entropy Alloys for High-temperature and Cost-effective Applications: Rui Feng; Chuan Zhang; Michael Gao; Fan Zhang; Peter Liaw; University of Tennessee; Knoxville; Computherm LLC; National Energy Technology Laboratory

4:20 PM Invited
Designing of Coherent Microstructure with Cuboidal B2 Nanoprecipitation Strengthening in BCC-based High-entropy Superalloys: Qing Wang; Beibei Jiang; Xiaona Li; Chuang Dong; Peter K. Liaw; Dalian University of Technology; University of Tennessee

4:40 PM Invited
Solidification Processing and Microstructural Development in High-entropy Alloys: Reza Abbaschian; Nicholas Derimow; Abraham Munitz; Louis Santodonato; University of California, Riverside; Nuclear Research Center, Negev; Oak Ridge National Laboratory

5:00 PM Invited
A Novel Dual-phase Gradient Material of High-entropy Alloy Prepared by Spark Plasma Sintering: Wei Zhang; Mingyang Zhang; Fangzhou Liu; Yingbo Peng; Yong Liu; Central South University; Nanjing Agricultural University

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment — Materials Design and Discovery II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Tuesday PM | March 12, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University

2:00 PM Invited
Challenges in Scale-bridging Computational Materials Science: Alain Karma; Northeastern University

2:30 PM Invited
Interfacing Ab Initio Calculations, Calphad Models, Thermodynamic Databases, Web Interfaces and Visualization Tools: Axel Van De Walle; Ruoshi Sun; Qijun Hong; Sara Kadkhodaie; Chiraag Nataraj; Helena Liu; Sayan Samanta; Siya Zhu; Brown University

3:00 PM Invited
Uncertainty Quantification for Solute Transport Modeling: Dallas Trinkle; University of Illinois Urbana Champaign

3:30 PM Break

3:50 PM Invited
Machine Learning Applications in Materials Modeling, Data and Imaging: Dane Morgan; University of Wisconsin
4:20 PM
Rethinking Diffusivity of Ni50Al50 Melt under Extreme Conditions: An Ab Initio Molecular Dynamics Study. William Yi Wang; Jian Tang; Xiangyi Xue; Deye Lin; Tanvir Ahmed; Jun Wang; Bin Tang; Shun-Li Shang; Xingyu Gao; Irina Belova; Haifeng Song; Graeme Murch; Jinshan Li; Zi-Kui Liu; 1Northwestern Polytechnical University; 2Northwestern Polytechnical Univ; 3Institute of Applied Physics and Computational Mathematics, Beijing; 4University of Newcastle; 5Pennsylvania State University

MATERIALS DESIGN

ICME Case Studies and Validation: Extreme Environments — Session II


Program Organizers: James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwon Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Tuesday PM | March 12, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Dongwon Shin, Oak Ridge National Laboratory

2:00 PM Invited
Resisting Attack by Hot CO2: A Comparison of Fe- and Ni-base Alloys. David Young; Jianqiang Zhang; 1University of New South Wales

2:40 PM Invited
Design and Analysis of Mesoscale Reduced Order Models for Predicting Microstructure Evolution in Extreme Environments. Aaron Kohnert; James Stewart; Laurent Capolungo; Remi Dingreville; 1Los Alamos National Laboratory; 2Sandia National Laboratories

3:20 PM Break

3:40 PM Invited
Predicting Behavior and Designing Alloys for Extreme Environments. Bruce Pint; 1Oak Ridge National Laboratory

4:20 PM Invited
Design of Creep-resistant, Alumina-forming Ferrous Alloys with ICME Approach. Yukinori Yamamoto; Michael Brady; Govindarajan Muralidharan; Bruce Pint; Dongwon Shin; Sangkeun Lee; Michael Santella; Philip Mazziasz; 1Oak Ridge National Laboratory; 2Oak Ridge National Laboratory (Retired)

5:00 PM
Materials for Extreme Environments: The Role of Data Analytics. Ram Devanathan; Jovan Araiza; Jennifer Bauer; Gary Black; Michael Gao; Michael Glazoff; Lianshan Lin; Thomas Lograsso; Turab Lookman; Pratik Ray; Vyacheslav Romanov; Kelly Rose; Arun Sathanur; Dongwon Shin; Ashley Weber; Yukinori Yamamoto; Jeffrey Hawk; 1Pacific Northwest National Laboratory; 2National Energy Technology Laboratory; 3Idaho National Laboratory; 4Oak Ridge National Laboratory; 5Ames Laboratory; 6Los Alamos National Laboratory

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Microstructural Evolution II

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Tuesday PM | March 12, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Fadi Abdeljawad, Clemson University; Gregory Rohrer, Carnegie Mellon University

2:00 PM Invited
Phase Transformation Strengthening in High Entropy Alloys. Maryam Ghasseodi; Changning Niu; Carlyn LaRosa; Jiashi Miao; Michael Mills; 1Ohio State University

2:30 PM
Coupling of the Trajectory of Grain Boundaries with the Diffusion-controlled Growth Dynamics of Alloys: Silvere Akamatsu; Sabine Bottin-Rousseau; Supriyo Ghosh; Alain Karma; Mathis Plapp; 1CNRS; 2Sorbonne University; 3TAM University; 4NEU

2:50 PM
Atomic-level Description of Grain Boundary Structure and Dynamics in Al-based Alloy. Marcela Trybula; Pawel Zieba; 1Institute Metallurgy and Materials Science PAS

3:10 PM Invited
Grain Boundary Diffusivity in Nanocrystalline Metals: Stability and Transport. Jessica Krogstad; 1University of Illinois, Urbana-Champaign

3:40 PM Break

4:00 PM
Solid-liquid Interface Migration in Terbium: Kinetics vs. Thermodynamics. Mikhail Mendeleev; Feng Zhang; Huajing Song; Yang Sun; Cai-Zhuang Wang; Kai-Ming Ho; 1Ames Laboratory

4:20 PM
Phase Transformations in Nanocrystalline Fe Alloys: Interface Generation and Thermal Stability. Dor Amram; 1Christopher Schuh; 2Massachusetts Institute of Technology

4:40 PM
Kinematic Accessibility and Thermodynamic Stability of Geometrically Complex Grain Boundaries. Logan Ware; 1Daniel Suzuki; Zachary Cordero; 1Rice University

5:00 PM
Phase Competition during Solidification of Terbium. Huajing Song; Mikhail Mendeleev; 1Ames Laboratory US Department of Energy
ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Thermodynamics and Electrochemistry

Sponsored by: TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jonghyun Lee, Iowa State University; Antoine Allanoire, MIT - DMSE; Samuel Wagstaff, Novelis

Tuesday PM | March 12, 2019
008B | Henry B. Gonzalez Convention Center

Session Chair: Jinsuo Zhang. Virginia Polytechnic Institute and State University

2:00 PM Introductory Comments

2:05 PM
Modeling Molten Salt Chemical Behavior for Nuclear Reactor Applications: Theodore Besmann; Johnathan Ard; Jacob McMurray; University of South Carolina; Oak Ridge National Laboratory

2:35 PM
Electrochemistry to Understand and Control Materials Corrosion in Molten Li2BeF4 (FLiBe) Salt: William Doniger; Mohamed Elbakshwan; Cody Falconer; Karl Britsch; Adrien Couet; Kumar Sridharan; University of Wisconsin, Madison

2:55 PM
Thermodynamics Coupled Molten Salt Reactor Performance Simulations: Jacob McMurray; Theodore Besmann; Jonathan Ard; Ben Collins; Ben Betzler; Bernie Fitzpatrick; Markus Piro; Stephen Raiman; Lou Qualls; Oak Ridge National Laboratory; University of South Carolina; University of Ontario Institute of Technology

3:15 PM
Chromium Corrosion Properties in Molten Salt: Fundamental Data Measurement and Salt Structure Identification: Jinsuo Zhang; Yafei Wang; Virginia Polytechnic Institute and State University

3:35 PM Break

3:55 PM
Use of Carbon Tetrachloride to Remove Trace Oxide and Lower Corrosivity of Molten Chloride Salts: James Kurley; Richard Mayes; Stephen Raiman; Phillip Halstenberg; Abbey McAlister; Oak Ridge National Laboratory

4:15 PM
Electrochemical Properties of Tellurium in Molten Salts: Soluble-insoluble Transition Behavior: Hojong Kim; Timothy Lichtenstein; Pennsylvania State University

4:35 PM
Effect of Purification Procedures on Electrochemistry of Molten NaCl-KCl-MgCl2: Michael Simpson; Nicole Orabona; University of Utah

MATERIALS PROCESSING

Materials Processing Fundamentals — Multiphysics - Processes and Properties Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte. Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanoire, MIT - DMSE; Samuel Wagstaff, Novelis

Tuesday PM | March 12, 2019
212A | Henry B. Gonzalez Convention Center

Session Chairs: Jonghyun Lee, Iowa State University; Antoine Allanoire, MIT

2:00 PM Introductory Comments

2:05 PM Invited
The Materials Science Laboratory – Electromagnetic Levitator on the International Space Station: A Case Study with the Alloy Ti-48Al-2Cr-2Nb: Rainer Wunderlich; M Mohr; U Hecht; R Hyers; D Matson; G Lohöfer; O Shuleshova; H.-J. Fecht; Ulm University; ACCESS eV; University of Massachusetts; Tufts University; Institut für Materialphysik im Weltraum; IFW Dresden

2:25 PM
Modeling of Fluid Flow Effects on Experiments Using Electromagnetic Levitation in Reduced Gravity: Gwendolyn Bracker; Xiao Xiao; Jonghyun Lee; Dieter Herlach; Markus Rettenmayr; Marcus Reintartz; Stefan Burggraf; Douglas Matson; Robert Hyers; University of Massachusetts; Tufts University; Iowa State University; Institut für Experimentalphysik IV, Ruhr-Universität Bochum and Institut für Materialphysik im Weltraum, Deutsches Zentrum für Luft- und Raumfahrt; Tufts University

2:45 PM
Investigation of Non-linear Effects in Viscosity Measurements by the Oscillating Drop Method in an Electromagnetic Levitation Device under Reduced Gravity Conditions: Rainer Wunderlich; Markus Mohr; Ulm University

3:05 PM
Short Range Order of Supersaturated Sodium Sulfate Solution: Jonghyun Lee; Yong Chan Jo; Sai Katamreddy; Geun Woo Lee; Iowa State University; Korea Institute of Standards and Science

3:25 PM
The Role of Cavitation in Ultrasound Metrology: Bitong Wang; Andrew Caldwell; Antoine Allanoire; Douglas Kelley; University of Rochester; Massachusetts Institute of Technology

3:45 PM Break

4:05 PM
Optimal Stator Design for Oxide Films Shearing Found By Physical Modelling: Agnieszka Dybalskai; Dmitry Eskin; Jayesh Patel; Birmingham University; Brunel University

4:25 PM
Reassessment of the Numerical Modeling of Equiaxed Solidification: John Coleman; Matthew Krane; Purdue University

4:45 PM
The Lattice Boltzmann Approach to Microstructural Convective Transport Simulations Using Parallel Cellular Automata: Andrew Kao; Matthew Alexandrakis; Ivars Krastins; Teddy Gan; Koulis Pericleous; University Of Greenwich
Tuesday PM | March 12, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Julie Tucker, Oregon State University

2:00 PM Invited
Deformation Mechanisms in a Candidate FeCrAl Alloy and Its Weldment after Neutron Irradiation: Dalong Zhang\(^1\); Maxim Gussev\(^2\); Samuel Briggs\(^3\); Philip Edmondson\(^3\); Yukinori Yamamoto\(^3\); Kevin Field\(^3\); Oak Ridge National Laboratory; Oregon State University

2:20 PM Invited
Effect of Friction Stir Welding on Microstructure Evolution on In Situ and Ex Situ Self-ion Irradiated MA956: Elizabeth Getto\(^3\); Nicholas Nathan\(^1\); Samuel Briggs\(^3\); Khalid Hattar\(^2\); Brad Baker\(^3\); United States Naval Academy; Sandia National Laboratories

2:40 PM Invited
Additively Manufactured Grade 91 Steel for Reactor Applications: Benjamin Effing\(^1\); Daniel Vega\(^1\); Yung Yoo\(^1\); Matthew Janish\(^1\); Eda Aydogan\(^1\); Todd Steckley\(^1\); Mark Ortega\(^1\); Carl Cady\(^1\); Thomas Lienert\(^1\); Stuart Maloy\(^1\); Los Alamos National Laboratory; Department of Energy

3:00 PM Invited
Visco-plastic Self Consistent (VPSC) Modeling of Deformation Processing of NFA-1 14YW Thin-walled Tubing: Soupitha Pol\(^1\); Irene Beyerlein\(^1\); Esihadul Alam\(^1\); John Lewandowski\(^1\); Stuart Maloy\(^1\); Robert Odette\(^1\); University of California, Santa Barbara; Case Western Reserve University; Los Alamos National Laboratory

3:20 PM Break

3:40 PM Invited
Correlation between the Microstructure of Precipitations and Their Mechanical Contributions with and without Radiation Damage: Tianyi Chen\(^1\); Lizhen Tan\(^1\); Ying Yang\(^1\); Rigen-Mo He\(^1\); Beata Tyburska-püsčel\(^1\); Kumar Sridharan\(^1\); Oregon State University; Oak Ridge National Laboratory; University of Wisconsin-Madison

4:00 PM Invited
Quantitative In-situ TEM Nanomechanical Testing of Model and Nuclear Relevant Engineering Alloys: Christopher Barr\(^1\); Khalid Hattar\(^2\); Sandia National Laboratories

4:20 PM Invited
Experimental and Modeling Study of Deformation Mechanisms in Irradiated ZIRLO: Samuel Briggs\(^3\); Pierre-Alexandre Juan\(^2\); Brittany Muntfering\(^3\); Hui Yang\(^3\); Marko Knezevic\(^3\); Remi Dingerville\(^3\); Jianmin Qu\(^3\); Khalid Hattar\(^2\); Oregon State University; Sandia National Laboratories; Tufts University; University of New Hampshire

4:40 PM Invited
Mechanical Properties of Tungsten Irradiated with a Thermal Neutron Shield: Lauren Garrison\(^3\); Yutai Katoh\(^1\); Akira Hasegawa\(^2\); Takeshi Miyazawa\(^1\); Oak Ridge National Laboratory; Tohoku University

5:00 PM Invited
Damage and Fracture of Nuclear Materials under Extreme Conditions: From Nuclear Graphite to TRISO Fuel Particles: Dong Liu\(^2\); Steven Knoll\(^1\); Mark Davies\(^1\); Arjan Vreeling\(^2\); Saurabh Kabra\(^1\); Houzheng Wu\(^1\); Martin Kuball\(^1\); Harold Barnard\(^1\); Robert Ritchie\(^2\); University of Bristol; NRG; USNC; Rutherford Appleton Laboratory; Loughborough University; Lawrence Berkeley National Laboratory

TUESDAY PM

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocrystalline Materials II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleoedden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Tuesday PM | March 12, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Wheeler, ETH Zurich; Erica Lilleoedden, Helmholtz-Zentrum Geesthacht

2:00 PM
Multifunctional Properties of Nanostructured Al Stabilized by Ca Grain Boundary Segregations and Intermetallic Particles: Xavier Sauvage\(^1\); Fabien Cuvilly\(^1\); Alan Russell\(^1\); Kaveh Edalati\(^1\); CNRS - GPM - University Rouen Normandy; Department of Materials Science and Engineering, Iowa State University and Ames Laboratory of the US Department of Energy; International Institute for Carbon-Nuclear Energy Research and Kyushu University

2:20 PM Invited
Role of Interfaces in Nanoscale Deformation Mechanisms of Shape Memory Yttria Stabilized Tetragonal Zirconia: Mohsen Asle Zoeni\(^1\); Ning Zhang\(^1\); Colorado School of Mines

2:50 PM
An Experimental and Atomistic Simulation Study of Strain Rate Deformation in Amorphous Ni-Zr Alloyed Thin Film: Bibhu Sahu\(^4\); Amian Dutta\(^4\); Rahul Mitra\(^4\); Indian Institute of Technology, Kharagpur; Indian Institute of Technology Kharagpur

3:10 PM
Rejuvenation of Nanocrystalline Metals: Glenn Babus\(^5\); McLean Echlin\(^5\); Charlotte Grigorian\(^5\); Christoph Gammer\(^5\); Oliver Renk\(^5\); Verena Maier-Kiener\(^5\); Daniel Kiener\(^5\); Timothy Rupert\(^5\); Tresa Pollock\(^5\); Daniel Gianola\(^5\); University of California, Santa Barbara; University of California, Irvine; Erich Schmid Institute for Materials Science, Austrian Academy of Sciences; Montanuniversität Leoben

3:30 PM Break

3:50 PM
Atomistic Mechanisms on Interface- and Surface-Mediated Coble-Type Creep in Nanostructured Metals: Scott Mao\(^6\); Li Zhong\(^6\); Jiangwei Wang\(^6\); Yang He\(^6\); University of Pittsburgh; Zhejiang University
4:10 PM Invited
In Situ Micromechanical Testing of Ni Thin Films for Understanding the Deformation Behaviour at Grain Boundaries: 
Dhriti Bhattacharyya; Alan Xu; Michael Saleh; Lyndon Edwards; 
*Australian Nuclear Science and Technology Organization

4:40 PM
Unexpected Behavior of Stiffness and Thermal Expansion in Nano-particles: Siu-Wai Chan; Columbia University

5:00 PM Invited
Influence of Ion Beam Assisted Deposition (IBAD) on Interface Stability in PVD Thin Films: Y. Xiao; Meng Chen; Huan Ma; Ralph Spolenak; Jeffrey Wheeler; ETH Zurich; EMPA

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — Micromechanical Testing under Extreme Conditions

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosenmann, University of California, Davis; Afroz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday PM | March 12, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Afroz Barnoush, Norwegian University of Science and Technology; Samantha Lawrence, Los Alamos National Laboratory

2:00 PM Invited
Probing Hydrogen-deformation Interactions in Additively Manufactured Stainless Steel using Synchrotron X-rays: 
Samantha Lawrence; Reetu Pokharel; Bjørn Clausen; Donald Brown; John Carpenter; Chris San Marchi; Los Alamos National Laboratory; Sandia National Laboratories

2:25 PM
Environmental TEM Study of Hydrogen Effect on the Evolution of Irradiation-induced Dislocation Loops in a-Fe at Elevated Temperature: Longchao Huang; Zhangjie Wang; Degang Xie; Zhiwei Shan; Xi’an Jiaotong University; Xi’an Jiaotong University

2:45 PM
Evaluation of Hydrogen Embrittlement of Technical Relevant Alloy Systems by Means of Electrochemical Nanoindentation: Anna Ebner; Patrick Lebenegegg; Alexander Leitner; Helmut Clemens; Reinhard Pippan; Verena Maier-Kiener; Department Physical Metallurgy and Material Testing; Erich Schmidt Institute of Materials Science

3:05 PM
In Situ Scanning Electron Microscopy for Microstructural and Micro-mechanical Characterization during Hydrogen-charging: Jinwoo Kim; Cemal Cem Tasan; Massachusetts Institute of Technology

3:25 PM Break

3:45 PM Invited
Hydrogen-dislocation Interaction in Al and Fe Revisited by Quantitative Mechanical Tests Inside TEM: Degang Xie; Longchao Huang; Evan Ma; Ju Li; Zhiwei Shan; Xi’an Jiaotong University; John Hopkins University; Massachusetts Institute of Technology

4:10 PM
Virtual Experiments: Discrete Dislocation Plasticity Simulations of Hydrogen in Micronanotubes: Haiyang Yu; Alan Cocks; Edmund Tarleton; University of Oxford

4:30 PM
Multiscale 3D Investigation of Environmental Barrier Coatings and Damage in Angle-interlocked Ceramic Matrix Composite under In Situ Loading: Hrishihesh Bale; Aiy Badran; Robert Ritchie; David Marshall; Carl Zess X-ray Microscopy; University of Colorado, Boulder; University of California, Berkeley

4:50 PM
Nanowinned Al-Fe Solid Solution Alloys with High Strength and Enhanced Thermal Stability: Qiang Li; Sichuang Xue; Yifan Zhang; Jian Wang; Haiyan Wang; Xinghang Zhang; Purdue University; University of Nebraska, Lincoln

5:10 PM Invited
Under Pressure: Deformation of Metallic Nanocrystals up to 20 GPa: Wendy Gu; Abhinav Parakh; Stanford University

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session III

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty; CSU Maritime Academy; Dzung Luong, New York University

Tuesday PM | March 12, 2019
303B | Henry B. Gonzalez Convention Center

Session Chairs: Chandra Veer Singh, University of Toronto; Brandon Runnels, Brandon Runnels University Of Colorado Colorado Springs; Dung Dinh Luong, New York University

2:00 PM Invited
Modeling Composites and Microstructure Evolution with MOOSE/MARMOT in Nuclear Materials: Daniel Schwen; Sebastian Schunert; Larry Aagesen; Andrea Jokisaari; Yongfeng Zhang; Idaho National Laboratory

2:20 PM Invited
Atomic Structure and Solute Segregation at Semi-coherent Metal/Oxide Interfaces: Samrat Choudhury; Blas Uberuaga; University of Idaho; Los Alamos National Laboratory

2:40 PM
Atomistic to Continuum Modeling of Metalized Polyvinylidene Fluoride with Aluminum Nanoparticles: Brandon Runnels; University of Colorado Colorado Springs

3:00 PM
Multiscale Modeling of the Elasto-plastic Behavior of Architected and Nanostructured Cu-Nb Composite Wires and Comparison with Neutron Diffraction Experiments: Tang Gu; David McDowell; Georgia Institute of Technology

3:20 PM Break

4:00 PM Invited
Multiscale Synergetic Damage Mechanics Methodology for Predicting Progressive Failure in Composite Structures: Chandra Veer Singh; University of Toronto
4:20 PM Invited
Novel Stress-assisted Structural Transformation in Mo/Cu and Plasticity Enhancement Bicontinuous Intertwined Materials: Lijie He1; Niaz Abdolrahim1; 1University of Rochester

4:40 PM
Hybrid Nanocomposite Bio-Inspired from Bone: Mohammad Moghbsoudi-Ganjeh1; Liqiang Lin1; Xiaodu Wang1; Xiaowei Zeng1; 1University of Texas at San Antonio

5:00 PM
Atomistic Simulation Studies of the Sulphide Minerals with the Pentlandite Structure: Mofuti Mehta1; Phuti Ngoepe1; 1University of Limpopo

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS
Nanarchitected and Morphology-controlled Nanoporous Materials — NP Materials-mechanical Behavior I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Tuesday PM | March 12, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Diana Farkas, Virginia Polytechnic Institute; Wendy Gu, Stanford University

2:00 PM Invited
Mechanical Response of Au Nano-foams from Atomistic Simulations: Diana Farkas1; 1Virginia Polytechnic Institute

2:30 PM
A Modified Scaling Law for Stiffness of Nanoporous Materials Accounting for Bending and Stretching Modes of Nodes and Ligaments: Haomin Liu1; Niaz Abdolrahim1; 1University of Rochester

2:50 PM
Tensile Behavior of Stitched Log-pile Cellular Structures Fabricated via Direct Laser Writing: Alina Garcia Taormina1; Andrea Hodge1; 1University of Southern California

3:10 PM Invited
Mechanical Properties of Metallic Nanocubes: Bimetallic Interfaces and Porosity: Wendy Gu1; Mehrdad Kiani1; Radhika Patil1; 1Stanford University

3:40 PM Break

4:10 PM
Modified Gibson-Ashby Model Accounting for Network Coordination Derived from Stochastic Modeling of the Mechanical Behavior of Nanoporous Materials: Muyan Seif1; Thomas Balk1; Matthew Beck1; 1University of Kentucky

4:30 PM
Controlling Effect of Ligaments and Nodes Morphology on the Deformation Behavior of Nanoporous Cu with Varying Relative Density: Lijie He1; Muhammad Hadi1; Haomin Liu1; Niaz Abdolrahim1; 1University of Rochester

4:50 PM
Shear Band Suppression in High-strength Cu/Mo Nanocomposites with Hierarchical Heterogeneous Structures: Yuchi Cui1; Benjamin Derby1; Amit Misra1; 1University of Michigan, Ann Arbor

5:10 PM
Solid-shell/Porous-core Amorphous Carbon Nanospheres: Boxing Xu1; 1University of Virginia

ELECTRONIC MATERIALS

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chao-hong Wang, National Chung Cheng University; Chi-Hsing Chen, National Chung Hsing Univ; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jae Ho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

Tuesday PM | March 12, 2019
217D | Henry B. Gonzalez Convention Center

Session Chairs: Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute

2:00 PM Invited
Study on the Phase Diagrams of Bi-Te Binary and Bi-Te-RE (Yb, La, Ce, Nd, Sm, Tb, Er) Ternary Systems: Ligang Zhang1; Mingyue Tan1; Cun Mao1; Libin Liu1; 1Central South University

2:20 PM
Phase Diagrams of the Bi-In-Se-Te Quaternary System: Sinn-wen Chen1; Yi-cheng Lin1; 1National Tsing Hua University

2:40 PM
Solid-state Interfacial Reactions of Sn Solder Joints with Bi3Te5-based Thermoelectric Materials: Chao-hong Wang1; Mei-hau Li1; 1National Chung Cheng University

3:00 PM
Investigation into Phase Transformation of (La,Sr)y(Cr1-x,Fex)O3–δ/YSZ for Dual-phase Oxygen Transport Membranes: Hooman Sabaroun1; Boxun Hu1; Prabhakar Singh1; Yu Zhong1; 1Worcester Polytechnic Institute; 2University of Connecticut

3:20 PM
Thermodynamic Investigation into the Chemical Stability of LSCrF-ScSZ: Hooman Sabaroun1; Yu Zhong1; 1Worcester Polytechnic Institute

3:40 PM Break

4:00 PM
Thermodynamic Stability of LiMn2-xMxO4 Spinels with Multivalent Transition-Metal-Substitutions: Dajian Li1; Weibin Zhang1; Keke Chang1; Hans Seifert1; 1Karlsruhe Institute of Technology; 2Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences

4:20 PM
Understanding Cation Diffusion Pathways and Roadblocks in Polymorphs of V2O5: Yuting Luo1; Sarbabjit Banerjee1; 1Texas A&M University

4:40 PM
Effect of Tungsten Doping on the Structure and Electronic Properties of Gallium Oxide: Vishal Zade1; Mallesham Bandi1; Ramana Chintalapalle1; 1University of Texas, El Paso
5:00 PM
Size Dependence of Nucleation Controlled Hysteresis in Free-Standing VO, Rods: Heidi Clarke1; Bill Caraway2; Diane Sellers3; Erick Brahman1; Raymundo Arroyave1; Sarbjit Banerjee2; Patrick Shamberger3; 1Texas A&M University

5:20 PM
Effect of Inorganic Additives on Sintered Cu Conductive Thick Film: Jyun Yang Wang1; Cheng-Yi Liu1; 1National Central University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Modelling and Simulation of Phase Transformations in Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhruti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Tuesday PM | March 12, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Matthew Steiner, University of Cincinnati; Christopher Weinberger, Colorado State University

2:00 PM
Interfacial Energetics and Structure Analysis of the Ferrite-Cementite and Austenite-Cementite Microstructures of Steel Using Empirical Potentials: Matthew Guziewski1; Shawn Coleman1; Christopher Weinberger2; 1U.S. Army Research Laboratory; 2Colorado State University

2:20 PM
Phase-Field Simulation of Intermetallic Phase Precipitation in a High-Alloyed Lightweight High-strength Steel: Carsten Drouven1; Wenwen Song1; Wolfgang Bleck1; 1RWTH Aachen University

2:40 PM
Dimensionality in Coarsening at the Critical Composition: W. Beck Andrews1; Peter Voorhees1; Katsuyo Thornton1; 1University of Michigan; 2Northwestern University

3:00 PM
Ostwald Ripening of Spherical Particles in Multicomponent Alloys: Kyoungdoc Kim1; Peter W. Voorhees1; 1Northwestern University

3:20 PM
Beyond Hillert, Mullins and Modified Mean Field: A Case for a Stochastic Grain Growth Model: Alex Moser1; Chandra Pande1; 1U.S. Naval Research Laboratory

3:40 PM Break

4:00 PM
The Development of Continuum-based Models of Interface Energetics in Steels as a Function of Temperature: Christopher Weinberger1; Matthew Guziewski2; Shawn Coleman1; 1Colorado State University; 2U.S. Army Research Laboratory

4:20 PM
Mesoscale Modeling of Grain Boundary Migration Driven by Crystallographically Informed Energy and Mobility: Brandon Runnels1; 1University of Colorado, Colorado Springs

4:40 PM
Nucleation Kinetic Path: An Application of the Thermodynamic Extremum Principle: Manan Bonvalot1; Thomas Philipp2; John Ágren3; 1KTH Royal Institute of Technology; 2Ecole Polytechnique - CNRS; 3KTH Royal Institute of Technology

5:00 PM
Phase Transformation Strengthening in Metastable FCC Materials: Carlyn Larosa1; Changning Niu1; Jiashi Miao1; Michael Mills2; Maryam Ghazisaeidi1; 1Ohio State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Nanostructured Metals

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Tuesday PM | March 12, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Zachary Cordero, Rice University

2:00 PM
Phase Transformations and Phase Separation in Nanocrystalline Fe Alloys: Thermal Stability and Densification Behavior: Dor Amram1; Christopher Schuh1; 1Massachusetts Institute of Technology

2:30 PM
Effect of Boron on Processing and Consolidation of Tungsten Nanopowders: Brady Butler1; Scott Middlemas2; Eric Klier3; James Paramore3; Daniel Casem4; Kevin Hemker1; 1US Army Research Laboratory; 2Idaho National Laboratory; 3Johns Hopkins University

2:50 PM
Fabrication of Bulk Nanostructured Materials with High Toughness through Simple Powder Processing: Olivia Donaldson1; Timothy Rupert1; 1University of California, Irvine

3:10 PM
Mechanical Properties of Gas-atomized and Hot-extruded Aluminum Alloys: Joe Croteau1; David Seidman2; David Dunand3; Nhon Vo1; 1NanoAl LLC; 2Northwestern University

3:30 PM
Effect of the Milling and Parameters of Sintering of the Ti-15Mo Powder on the Microstructure and Mechanical Properties: Anna Terynkova1; Kristina Bartha1; Jiří Kozlík2; Tomáš Chráska3; Josef Stráský2; Miloš Janecek2; 1Charles University; 2Institute of Plasma Physics

3:50 PM Break

4:10 PM
Novel Pathways to Low Cost Titanium Manufacturing: From Powder to Part: Stefan Guziewski1; Peter King1; Saden Zahiri1; Christian Doblin1; Mark Styles1; Andrew Urban1; Alejandro Vargas Uscategui1; Leon Prentice1; 1CSIRO Manufacturing

4:30 PM
Microstructure Evolution and Mechanical Properties of Medical Material Mg-3Zn Alloy Prepared by Semi-solid Powder Injection Moulding: Xia Luo1; Chao Fang1; Zhou Fan1; Bensheng Huang2; Jun Yang3; 1Southwest Petroleum University
MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals IV

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojjong Kim, Pennsylvania State University; Shafig Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

Tuesday PM | March 12, 2019
210B | Henry B. Gonzalez Convention Center

Session Chair: Baba Alafara, University of Ilorin

2:00 PM
New Dissolution Process of Iridium to Hydrochloric Acid: Yuto Kobayashi1; Shota Yamada2; Takashi Nagai; Chiba Institute of Technology

2:25 PM
Leaching of Tellurium and Bismuth from the Dashuigou Tellurium Deposit in H2SO4 and FeCl3 Media: Lixiong Shao1; Jiang Diao1; Liang Liu1; Bing Xie1; Chongqing University

2:50 PM
Development in Rare Earth Metal Reduction Technologies: A Review: Fangyu Liu1; Matthew Earlam2; Patrick Taylor; Colorado School of Mines

3:15 PM
Study on Thiosulfate Leaching of Gold by Cycling Barren Solution: Yongbin Yang1; Lai Meixiang; Qiang Zhong1; Qian Li1; Bin Xu1; Tao Jiang; Central South University

LIGHT METALS

REWAS 2019: Cast Shop Recycling Technologies — Cast Shop and Recycling

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Aluminum Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mertol Gökelma, Norwegian University of Science and Technology; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

Tuesday PM | March 12, 2019
007B | Henry B. Gonzalez Convention Center

Session Chair: Mertol Gökelma, Norwegian University of Science and Technology

2:00 PM
Introductory Comments

2:05 PM
Invited
LIBS Based Sorting - A Solution for Automotive Scrap: Georg Rombach1; Hydro Aluminium Rolled Products GmbH

2:35 PM
Positive Material Identification (PMI) Capabilities in the Metals Secondary Industry: An Analysis of XRF and LIBS Handheld Analyzers: Leslie Brooks1; Gabrielle Gaustad2; Rochester Institute of Technology; Alfred University

3:00 PM
The Vertical Floatation Decoater for Efficient, High Metal Yield Depoating and Dewatering of Aluminum Scrap: Robert De Sara1; Sam Luke1; Energy Research Co.; DG Marshall Associates, Inc.

3:25 PM
A Method for Assessment of Recyclability of Aluminum from Incinerated Household Waste: Meteol Gökelma1; Ingeber Meling1; Ece Soyulu; Anne Kvitvold2; Gabriella Traneli; Norwegian University of Science and Technology; Istanbul Technical University; SINTEF Materials and Chemistry

3:50 PM Break

4:05 PM
Isothermal Hot Pressing of Skimmed Aluminium Dross: Influence of the Main Processing Parameters on In-house Molten-metal Recovery: Varuzan Kevorkijan1; Impol R in R d.o.o.

4:30 PM
Manufacturing of Hydrogen on Demand Using Aluminum Can Scrap with Near Zero Waste: Jed Chechetts1; Neale Neelameggham1; Natrium Hydroxide Corporation; IND LLC

4:55 PM
Aluminum Alloys in Autobodies: Sources and Sinks: Ayomipo Arowoso1; Gabrielle Gaustad2; Rochester Institute of Technology; Alfred University

ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Electronics and Battery Recycling

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleurialt, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

Tuesday PM | March 12, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: Camille Fleurialt, Gopher Resource

2:00 PM
Li-Cycle – A Case Study in Integrated Process Development: Boyd Davis1; Kevin Watson1; Alain Roy1; Ajay Kochhar2; Darcy Tait2; Kingston Process Metallurgy Inc.; Li-Cycle Corp.

2:20 PM
Lithium Ion Batteries, How to Generate Value Out of End of Life Mobile Units: Christer Forsgren1; Stena Recycling International AB

2:40 PM
Advances in Lithium-ion Battery Electrolytes: Prospects and Challenges in Recycling: Joseph Hamuyuni1; Fiseha Tesfaye1; Aalto University; Abo Akademi University

3:00 PM
An Overview of the Recycling Processes and Technologies for Spent Lithium-Ion Batteries: Haruna Pinegar1; York Smith1; University of Utah

3:20 PM Break

3:40 PM
Increasing Lead Battery Performance Efficiency: Timothy Ellis1; John Howes2; RSR Technologies, Inc.; Redland Energy Group
MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell’s 80th Birthday — Properties of Castings

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Murat Tiryakioğlu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Tuesday PM | March 12, 2019
006B | Henry B. Gonzalez Convention Center

Session Chair: Mark Jolly, Cranfield University

2:00 PM
Characterization of Lead Sheet Manufactured using Traditional Sand-casting Technique: Arun Prabhakar1; Konstantinos Salonitis2; Mark Jolly; 1Cranfield University

2:25 PM
On the Intrinsic and Extrinsic Microstructure-Property Effects in Cast Aluminum Alloys: Murat Tiryakioğlu1; 1University of North Florida

2:50 PM
Measurement of Residual Strain in the Cylinder Bridge of High Pressure Die Cast A383 Engine Blocks Using Neutron Diffraction: Tao Li1; Chris Fancher2; Jeffrey Bunn3; Vishweshwar Arvika4; Ilya Levin5; Laurentiu Nastac6; Luke Brewe7; 1University of North Florida; 2Oak Ridge National Laboratory; 3Nemak Alabama

3:10 PM
Relation Between Microstructure and Tensile Properties of V and B added Al-7Si Alloy: Ozkan Kesen1; Ahmet Filiz2; Selim Temel3; Özkan Gürsoy4; Eray Erzi; Derya Dispınar; 1Istanbul University

3:30 PM Break

3:50 PM
The Effect of Friction Stir Processing on Biphasic & Structural Quality in A356 Alloy Castings: Murat Tiryakioğlu1; Nelson Netto2; Paul Eason3; 1University of North Florida

4:10 PM
Effect of Copper and Nickel Addition on Mechanical Properties of A356 Alloy and Assessment of Mechanism of Pore Formation: Kerim Yildirim1; Johannes Brachmann1; Derya Dispınar1; Andreas Buhrig-Polaczek1; Uwe Vroomen2; 1RWTH; 2Istanbul University

4:30 PM
Aluminum Alloy with High Mg Content: Casting Studies for Microstructural Evolution, Phase Formation and Thermophysical Properties with Different Alloying Elements: Armagan Gült1; Özkan Gürsoy2; Özkan Kesen3; Eray Erzi4; Derya Dispınar5; Eyyup Kayali6; 1Renault; 2Istanbul University; 3Istanbul Technical University

4:50 PM
Correlation between Melt Quality and Machinability of A9Si3Cu HPDC Alloy: Halil Kalkan1; Özgen Gürsoy2; Ömer Vardar3; Eray Erzi4; Derya Dispınar4; 1Mercedes Benz; 2Istanbul University

5:10 PM
Change in Sr Modification by Duration and Its Effect on Mechanical Properties of A360 and A413 Alloy: Iнал Duygun1; Özgen Gürsoy2; Eray Erzi4; Derya Dispınar4; 1Istanbul University

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — External Fields and the Columnar to Equiaxed Transition

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Tuesday PM | March 12, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Ma Qian, RMIT University; Gui Wang, University of Queensland

2:00 PM Keynote
Mechanisms of Primary Intermetallic Refinement by Ultrasonic Processing: Dmitry Eskin1; Feng Wang2; Iakovos Tsanakis3; Jiawei Mi4; 1Brunel University; 2Oxford Brookes University; 3University of Hull

2:20 PM
Influence of AlN Nanoparticles on Creep Resistance of Elektron21 Alloy Prepared by Intensive Melt Shearing: Hong Yang1; Yuanding Huang1; Karl Kainer2; Norbert Hort1; Hajo Dieringa2; 1Helmholtz-Zentrum Geesthacht

2:40 PM
Grain Initiation Behaviour and its Effect on Grain Refinement: Feng Gao1; Zhongyun Fan1; 1Brunel University

3:00 PM
Simulating the As-cast Microstructure of an Al-2Cu Alloy Formed under Ultrasonic Treatment: Gui Wang1; Paul Croaker2; Matthew Dargusch3; Damian McGuckin4; David StJohn4; 1University of Queensland; 2University of New South Wales; 3Pacific Engineering Systems International

3:20 PM Break

3:40 PM Invited
Promoting the Columnar-to-Equiaxed Transition and Grain Refinement of Ti alloys during Additive Manufacturing: Michael Bermingham1; 1University of Queensland

4:00 PM Invited
Prediction of the Columnar to Equiaxed Transition in Bottom Cooled Aluminium Copper Cylinders: Thomas, J. Williams; Christoph Beckermann; 1University of Iowa

4:20 PM
Directional Solidification to form Nanoscale Eutectic Microstructures in Al-Cu Thin Films: Eli Sullivan1; John Tomko2; Patrick Hopkins1; Jerrold Floro1; 1University of Virginia
4:40 PM
Measurements of Microstructure Evolution and Kinetics during Laser-induced Rapid Solidification of Al-based Alloys: Joseph McKeown1; John Roelhang2; Seth Giffiths3; Kai Zweicker3; Amy Clarke3; Christian Leinenbach3; Jörg Wiezorek1; Marvin H. Matthews1; 1Lawrence Livermore National Laboratory; 2Empa - Swiss Federal Laboratories for Materials Science and Technology; 3Colorado School of Mines; 4University of Pittsburgh

5:00 PM
Grain Refinement of Al-7Si through Addition of an Al-V-B Master Alloy: Yunhu Zhang1; C.Y. Ye2; Y.P. Shen2; W. Chang3; D.P. Wang3; D StJohn2; G. Wang4; Q.J. Zhai1; 1Shanghai University; 2The University of Queensland

**MECHANICS & STRUCTURAL RELIABILITY**

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session IV

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Saurabh Puri, Microstructure Engineering: Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday PM | March 12, 2019
303A | Henry B. Gonzalez Convention Center

**Session Chairs:** Saurabh Puri, Microstructure Engineering; Auger Thierry, CNRS/ENSAM/CNAM

2:00 PM Keynote
Elastic Strains from Laue XRay Microdiffraction on Bi-crystal: Pouya Tajdary1; Emeric Plancher1; Auger Thierry2; Véronique Favier2; Olivier Castelnau2; Julien Stodolna2; Odile Robach2; Claire Maurice2; Vincent Michel2; Jean-Baptiste Marijon3; Johan Petit4; Dominique Loisnard1; Ngoc-Lam Phong2; 1CNRS/ENSAM/CNAM; 2EDF; 3CEA; 4EMSE; 5Université Paris 10

2:40 PM
Measurement of the Thermal Expansion of Ti-7Al using High Energy X-ray Diffraction Microscopy: Rachel Lim1; Darren Pagan2; JY Peter Ko3; Anthony Rollett4; 1Carnegie Mellon University; 2Cornell High Energy Synchrotron Source

3:00 PM
Mechanical Behavior of Austenitic Alloy 709: Synchrotron X-Ray vs. Neutron Diffraction Characterization: Yuchen Zhao1; Jun-Sang Park2; Jonathan Almer1; Djamel Kaoumi1; 1North Carolina State University Department of Nuclear Engineering; 2Argonne National Laboratory

3:20 PM
Measuring Elastic and Plastic Anisotropies of a Metastable B-titanium Alloy, Timetal 18, by In Situ High Energy X-ray Diffraction (HEXRD): Jishnu Bhattacharyya1; Darren Pagan2; Srimaya Naik3; Ricardo Lebensohn3; Anthony Rollett4; Halham El-Kadiri1; Sean Agnew1; 1University of Virginia; 2Cornell University; 3Los Alamos National Laboratory; 4Carnegie Mellon University; 5Mississippi State University

3:40 PM Break

4:00 PM
Revealing the Role of Microstructure Architecture on Strength and Ductility of Ni Microwires by In Situ Synchrotron X-Ray Diffraction: Ravi Purushotham1; Abhinav Arya2; Girish Bojjavar Bojjawar2; Steven Van Petegem3; Henry Proudhon4; Céline Gérard4; Loic Signor5; Satyam Suwas5; Atul Chokshi5; Ludovic Thilly5; 1University of Poitiers; 2IISC-Bangalore; 3Paul Scherrer Institute; 4Institut Pprime CNRS-Université de Poitiers- ISAE ENMSA

4:20 PM
Four-Dimensional (4D) Characterization of Thermal Cycling Damage in Sintered Nano-Silver Solder by X-ray Microtomography: Irene Lujan Regalado1; Tarun Amla2; Jason Williams3; Yanghe Liu4; Ercan M. Dedeb; Shailesh Joshi5; Nithilesh Chawla6; 1Arizona State University; 2Toyota Research Institute of North America

4:40 PM
In Situ Synchrotron X-ray Microtomography of Stress Corrosion Damage in 304 SS under Humid Air Environment: Ryan Schoel1; Peter Kenesel2; Jonathan Almer3; Djamel Kaoumi1; 1North Carolina State University; 2Argonne National Laboratory; 3Argonne National Laboratory

**LIGHT METALS**

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Magnesium

**Sponsored by:** DGM (Deutsche Gesellschaft für Materialkunde eV), TMS: Magnesium Committee, TMS: Aluminum Committee

**Program Organizers:** Eric Nyberg, Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

Tuesday PM | March 12, 2019
006A | Henry B. Gonzalez Convention Center

**Session Chairs:** Eric Nyberg; Norbert Hort, Helmholtz-Zentrum Geesthacht

2:00 PM
Influences of SiC Particle Additions on the Grain Refinement of Mg-Zn Alloys: Yuanding Huang1; Jian Gu1; Sihang You1; Karl Kainer1; Norbert Hort1; 1Helmholtz-Zentrum Geesthacht

2:20 PM
Effect of Split Sleeve Cold Expansion on the Residual Stress, Texture and Fatigue Life of Rolled AZ31B Magnesium Alloy: Sasan Faghih1; Ercan M. Dedeb; Shailesh Joshi5; Nithilesh Chawla6; 1University of Waterloo

2:40 PM
A Theory for Designing Ductile Materials with Anisotropy: Amine Benzerga1; 1Texas A & M University

3:00 PM Concluding Comments
Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinlikil, Attilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Wednesday AM | March 13, 2019
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Session Chairs: Tao Jiang, Central South University; Onuralp Yucel, Istanbul Technical University

8:30 AM Introductory Comments

8:35 AM
Effect of Semiconductor Bornite on the Bioleaching of Chalcopyrite by Moderately Thermophiles: Kexin Chang; Yansheng Zhang; Libo Cao; Feng Chen; 1Central South University

8:55 AM
Study on Volatizing Tin from Tin-bearing Muddling by Carbothemic Reduction in Rotary Kiln: Jianfa Jing; Yufeng Guo; Feng Chen; Fuqiang Zheng; Lingzhi Yang; 1Central South University

9:15 AM
Isothermal Sulfation Roasting of Nickel Sulfide Minerals in a Static Air Atmosphere: Lizhen Wei; Caixiang Yu; Guangshi Li; Xiaolu Xiong; Hongwei Cheng; Qian Xu; Xionggang Lu; 1Shanghai University

9:35 AM
Manganese Partition between Slag and Liquid Metal in LD Converter: Abdulrhman Hassan; 1Tabbin Institute for Metallurgical Studies

9:55 AM Break

10:15 AM
Study on Preparation of Active Zinc Oxide from Zinc Ferrite by Calcined-roasting and Ammonia Complex Method: Zeqiang Xie; Yufeng Guo; Tao Jiang; Feng Chen; Fuqiang Zheng; Lingzhi Yang; 1Central South University

10:35 AM
Thermal Transformations of Main Components in Molybdenite Concentrates under SO2-containing Atmosphere: Hu Sun; Li Guanghui; Junjie Yu; Jun Luo; Mingjun Rao; Tao Jiang; 1Central South University

10:55 AM
Study on Phase Conversion from Zinc Ferrite to Zinc Oxide by Magnetic Roasting: Chao Wang; Yufeng Guo; Yujia Tan; Feng Chen; Zeqiang Xie; Linlin Zhang; 1Central South University

11:15 AM
A Novel Method of Recovering Rare Earths from Bayan Obo Rare-earth Concentrate under Super-gravity Field: Xi Lan; Jintao Gao; Zhancheng Guo; 1University of Science and Technology Beijing

11:35 AM Concluding Comments

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Jinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Wednesday AM | March 13, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Amy Clarke, Colorado School of Mines; Haiwen Luo, University of Science & Technology Beijing

8:30 AM Invited
Effect of the Crystallographic Orientation on the Void Growth during Creep of Superalloys: Caizhi Zhou; Tianju Chen; Ridwan Sakidja; Wai-Yim Ching; 1Missouri University of Science And Technology; 2Missouri State University; 3University of Missouri, Kansas City

8:50 AM Invited
Effects of Element Segregation/depletion and Precipitates on Grain Boundary Strength of Alloys: Lingfeng He; Mukesh Bachhav; Daniel Murray; Xiang Liu; Emmanuel Perez; Wen Jiang; Cheng Sun; Sebastien Teyssere; Xianming Bai; 1Idaho National Laboratory; 2Virginia Polytechnic Institute and State University

9:10 AM Invited
Precipitation Strengthened Al-Sc-Zr-Zr Alloys Modified with V, Nb, or Ta: Dinc Erdeniz; Anthony De Luca; David Seidman; David Dunand; 2Marquette University; 3Northwestern University

9:30 AM Invited
Resistance Spot Welding of Medium-Mn TRIP Steel with Excellent Mechanical Properties: Haiwen Luo; Shuoshuo Li; David Yang; 1University of Science and Technology Beijing; 2Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

9:50 AM Break

10:10 AM Invited
Abnormal Mechanical Properties Development of 1.25 Cr-0.5Mo Steel after Simulated Postweld Heat Treatment: Yang Shen; Cong Wang; 1Northwestern University

10:30 AM Invited
Strain Rate Effects on the Plasticity Mechanisms and Work Hardening of Metallic Micropillars: Matthew Daly; Zhaowen Lin; Horacio Espinosa; 1Northwestern University
NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Functional Thin Film Materials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoungh Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Wednesday AM | March 13, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jang-Sik Lee, Pohang University of Science and Technology

8:30 AM Invited
Assessment of Thin Films and Nanomaterials Functionality using Multimodal Approach: Ilia Ivanov1; Eric Muckley1; 2Oak Ridge National Laboratory

9:00 AM Invited
Emerging Memory Devices with Metal-halide Perovskite Materials: Jang-Sik Lee1; 1POSTECH

9:30 AM
Ferroelectricity in Hafnium Zirconate using Tungsten Capping Layer: Jaidah Mohan1; Si Joon Kim1; Jiyoung Kim1; 1University of Texas at Dallas

9:50 AM
Pinning of Structural Transition in VO2 Thin Films: Adele Moatti1; Ritesh Sachan1; John Prater1; Jagdish Narayan1; 1North Carolina State University

10:10 AM Break

10:30 AM Invited
Advances in MOCVD Production of Complex Materials from Single-source Precursors: Phase Pure Metal Phosphide Thin Films: Kenton Whitmire1; Desmond Schipper1; Andrew Leitner1; 1Rice University

11:00 AM
Influence of Layer Thickness on Microstructure and Optical Properties of AlN/SiO2 and AlN/Ag Nanomultilayers: Chelsea Applegate1; Andrea Hodge1; 1University of Southern California

11:20 AM
Emergence of High-temperature Superconductivity in B-doped Q-carbon: Ritesh Sachan1; Anagha Bhaumik1; Siddharth Gupta1; Jagdish Narayan1; 1U.S. Army Research Office; 2North Carolina State University

11:40 AM
A Novel Synthesis Method for Independent Control of Grain Size, Dispersion and Phase Composition of Thin Films: Paul Rasmussen1; Rohit Sarkar1; Jagannathan Rajagopalan1; 1Arizona State University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs II

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Suojit Gupt, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Wednesday AM | March 13, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Xingbo Liu, West Virginia University

8:30 AM Invited
Laser 3D Printing of SOFC: Jian Liu1; Shaofei Cheng1; Shuang Bai1; 1PolarOnyx Inc

8:55 AM
High Pressure Co-electrolysis of CO2/H2O in Tubular Solid Oxide Electrolysis Cells: Muhammad Taqi Mehraj1; Tak-Hyong Lim2; 1School of Chemical and Materials Engineering, National University of Sciences and Technology (NUST), Islamabad, Pakistan; 2Korea Institute of Energy Research (KIER)

9:15 AM Invited
Infiltration of Nickel Nanoparticles into Ni/YSZ Solid Oxide Fuel Cells: Anodes for Improved Performance: Yanchen Lei1; Tian-Le Cheng1; You-Hai Wen1; 1National Energy Technology Laboratory

9:40 AM
Phase Field Simulation of Ni Coarsening in SOFC Anodes in Dry and Humid Atmospheres: Yinkai Lei1; Tian-Le Cheng1; 1National Energy Technology Laboratory

10:00 AM Break

10:20 AM Invited
(M, Mn)3O4 Spinel for Advanced Electrical Conductive Layer for SOFC Stacks: Jung Pyung Choi1; Jeffry Stevenson1; Jeff Bonnett1; 1U.S. Army Research Office; 2North Carolina State University

10:45 AM
Nondestructive 3D Analysis of Solid Oxide Fuel Cells by Lab-based X-ray Nanotomography — Towards Computational Integrity: Stephen Kelly1; Sandrine Ricote2; Alexis Dubois2; William Harris1; John Berger2; Robert Kee2; 1Carl Zeiss X-ray Microscopy; 2Colorado School of Mines

11:05 AM Invited
Impact of the Humidity on the Nanostructure Degradation of Ionic Conductor YSZ from Electrodes of SOFCs upon Electrochemical Operation: Xueyan Song1; Yun Chen1; Harry Abernathy2; Gregory Hackett2; Yueying Fan2; Shiwool Lee2; Kirk Gerdes2; 1West Virginia University; 2National Energy Technology Laboratory

11:30 AM
Density Functional Theory Modeling of the Cation Impurity Diffusivity and Solubility in La0.8Sr0.2MnO3-δ (LSM) for Solid Oxide Fuel Cells: Yueh-Lin Lee1; Yuhua Duan1; Dan Sorescu1; Harry Abernathy2; Gregory Hackett2; 1National Energy Technology Laboratory; 2University of Wisconsin, Madison
ADDITIVE TECHNOLOGIES


Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beebe, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorangji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday AM | March 13, 2019
221A | Henry B. Gonzalez Convention Center

Session Chair: Mark Stoudt, National Institute of Standards and Technology

8:30 AM
Parametric Optimization of Laser-based Powder Bed Fusion for Gas Atomized Al-Zn-Mg-Sc-Zr Alloys: Le Zhou1, Holden Hyer1, Sharon Park2, Thinh Huynh2, Brandon McWilliams2, Kyu Cho3, Katherine Rice3, Yimeng Chen3, Alexander Giddings5, Yongho Sohn1; 1University of Central Florida; 2U.S. Army Research Laboratory; 3CAMECA Instruments, Inc.; 4CAMECA Instruments Inc

8:50 AM
Multiscale Advanced Characterization of Microstructures Formed during the Additive Manufacturing of Aluminium-silicon Alloys: Microstructure-process Relationship and Aging Effect: Williams Lefebvre4, Grégory Rose5, Fabien Cuvilly6; 4Éric Baustert7, 1Normandie University, GPM, UNIROUEN, INSA Rouen, CNRS; 2Volum-e/MMB

9:10 AM
Effects of Recycling Al10Si15Mg Alloy Powders in the Selective Laser Melting Process: Sharon Park1, Holden Hyer1, Le Zhou1, Thinh Huynh1, Edward Dein2, Brandon McWilliams2, Kyu Cho3, Yongho Sohn1; 1University of Central Florida; 2U.S. Army Research Laboratory

9:30 AM
Characterization of Rapidly Solidified Aluminum Alloy Microstructures: Chloe Johnson1, John Roehling1, Yaofeng Guo1, Francisco County2, Joe Jankowski3, Adam Stokes4, Michael Kaufman5, Joe McKewen5, Amy Clarke6, Lawrence Livermore National Laboratory; 7Colorado School of Mines

9:50 AM
Plasticity and Damage Mechanisms in Ti-6Al-4V Printed with Selective Laser Melting: Abieh Moridi1, Ali Gökhan Demir1, Barbara Previtali2, Bianca Colosimo2, John Hart2, Gern Tasarni2; 1Massachusetts Institute of Technology; 2Politecnico di Milano

10:10 AM Break

10:30 AM
Exploring the Limits of Thin Section Builds in Laser Powder Bed Fusion Process: Zhieng Wu1; Sneha Prabha Narra1, Jack Beuth1, Anthony Rollett2; 1Carnegie Mellon University

10:50 AM
Enhanced Ultrasonic Characterization of Additively Manufactured Parts Using Hybrid Capabilities: Luz Sotelo1, Michael Sealy3, Joseph Turner4, Cody Kanger4, Haitham Hadidi5; 1University of Nebraska - Lincoln

11:10 AM
Mechanisms of Melt Pool Evolution under Constant Input Energy Density in Laser Powder Bed Fusion Additive Manufacturing Process: Qilin Guo1, Cang Zhao1, Mingtai Qu2, Lianghua Xiong2; Luis Escano1, S. Mohammad Hajijazadeh1, Niranjan Parab1, Kamel Fezzaa1, Wes Everhart1, Tao Sun1, Lianyi Chen1; 1Missouri University of Science & Technology; 2Argonne National Laboratory; 3Honeywell FM&T

11:30 AM
Development of Process Parameters for a Low-cost Wire Arc Additive Manufacturing System: Miguel Navarro1, Aamer Matar2, Vladimir Pena3, Mohsen Eshraghi4; 1California State University, Los Angeles

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Process Development and Modeling

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Chari, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Wednesday AM | March 13, 2019
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Session Chairs: Indrajit Chari, University of Idaho; Chad Duty, University of Tennessee

8:30 AM
Invited Predictive Modeling of Process Parameter-microstructure-property Relationships of Additively Manufactured Parts: Yang Shin1, Neil Bailey2, Christopher Katinas3; 1Purdue University

9:00 AM
Phase-field Modeling of Dendritic Solidification for Additive Manufacturing Applications: Larry Aagesen1, Stephanie Pitts2, Richard Martineau3; 1Idaho National Laboratory

9:20 AM
Topology Optimization of Additively Manufactured Architectured Materials and Components for Energy Systems: Reza Behrou1, James Guest2; 1Idaho National Laboratory

9:40 AM
Quantifying the Effect of Local Texture Optimization on Additive Manufactured Structural Components: Andrea Rovinelli1, Mark Messner1, T.-L. Sham2, 1Argonne National Laboratory

10:00 AM Break

10:20 AM Invited Development and Optimization of Various Steels with ICME for Laser Powder Bed Fabrication Production: Idia Berglund1; Thomas Kozmetal1, Aminin Saboo2, Amit Bhera2, Pin Lu3, Chantal Sudbrack1, Jason Sebastian3; 1QuesTek Innovations, LLC

10:50 AM
Evolution of the Grain Morphology due to Solidification during Additive Manufacturing: Sudipta Biswas1, Daniel Schwen1, Yongfeng Zhang1; 1Idaho National Laboratory

11:10 AM
Laser Powder-bed Fusion of Type 304 Stainless Steel: Ferrite-austenite Transformation: Alicia Gaurin1, Lonnie Smith1, P. Chris Pistorius1; 1Carnegie Mellon University
WEDNESDAY AM

11:30 AM
Site-specific Property Maps of Additively Manufactured SS316L Using a Mesoscale, Multi-physics Modeling Framework: Nadia Kouraytem1; Carl Herriott1; Xuxiao Li2; Wenda Tan3; Vahid Tari2; Ben Anglin3; Anthony Rollett2; Ashley Spear1; 1University of Utah; 2Carnegie Mellon University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Microstructure Evolution

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski. Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Moshen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Wednesday AM | March 13, 2019
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Session Chairs: Lang Yuan, University of South Carolina; Wenda Tan, University of Utah

8:30 AM
Phase-field Modeling of Additive Manufacturing Cellular Solidification Microstructures: Supriyo Ghosh1; Li Ma2; Nana Ofori-Opoku1; Mark Stoudt1; Lyle Levine1; Jonathan Guyer1; 1Texas A&M University; 2National Institute of Standards and Technology

8:50 AM
Phase-field Modeling of Microstructure Evolution of Binary and Multicomponent Alloys during Selective Laser Melting (SLM) Process: Ali Ramazani1; Julia Kundin1; Christian Haase1; Ulrich Praht1; 1University of Michigan; 2Ruhr-University Bochum; 3RWTH-Aachen University; 4University of Freiberg

9:10 AM
Experimental and Simulation Study of Solidification and Microstructural Evolution of Ti and Ni Based Alloys for Laser Based Additive Manufacturing: Jonathan Raushi1; Sanjeev Tulasi1; Congyuan Zeng1; Shengmin Guo1; 1University of Michigan; 2University of South Carolina; 3University of Nevada, Las Vegas; 4University of Nebraska-Lincoln

9:30 AM
Phase Field Simulation of Microstructural Evolution in Direct Metal Laser Sintering of AlSi10Mg: Hossein Azizi1; Nikolai Provatasi1; Mohsen Mohammad1; 1University of New Brunswick; 2McGill University

9:50 AM Break

10:10 AM
Simulation of Solidification Microstructures under AM Thermal Conditions - Investigation of Solute Trapping Models in Phase Field Simulations: Bala Radhakrishnan1; Sarma Gorti1; John Turner1; 1Oak Ridge National Laboratory

10:30 AM
Influence of Lattice Mismatch and Nucleation Anisotropy on Incohering Temperature at Various Cooling Rates: Insights into Grain Refinement of Additively Manufactured Metals: Zhuming Wang1; Yaohong Xiao1; Pengwei Liu1; Yanzhou Ji1; Mark Horstemeyer2; Yi Wang1; Haley Douce1; Lei Chen1; 1Mississippi State University; 2Pennsylvania State University

10:50 AM
Solidification Simulation of Metal Additive Manufacturing with Phase-field Modeling: Jiwon Park1; Chang-Seok Oh2; 1Korea Institute Of Materials Science

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session III

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Nikolas Hrabe, National Institute of Standards and Technology - Boulder; Steve Daniewicz, University of Alabama; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University

Wednesday AM | March 13, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Nik Hrabe, National Institute of Standards and Technology

8:30 AM Invited
Mechanical Testing Results from MIDAS: Material Informed Digital Design Demonstration for Additive Structures: William Musinski1; Michael Groeber2; Paul Shade3; Edwin Schwalbach1; Sean Donegan1; Daniel Sparkman1; Michael Uchic1; Jonathan Miller1; 1US Air Force Research Laboratory

9:00 AM
Effect of Microstructure and Defects on the Fatigue Performance of Additively Manufactured 2205 Duplex Stainless Steel: Jayme Keist1; Andrew Iams1; Griffin Jones1; Todd Palmer1; 1Pennsylvania State University

9:20 AM
Predicting the Integrity of Additively Manufactured Nickel Alloys: Jeffrey Rossin1; Michael Groeber1; Bill Musinski1; Jonathan Miller1; Samantha Daly2; Tresa Pollock2; 1University of California Santa Barbara; 2US Air Force Research Laboratory

9:40 AM
Effect of Microstructure and Internal Defects on the Cyclic Deformation and Damage Behavior in Additively (SLM) Manufactured Al-Si Alloys: Shafaqat Siddique1; Mustafa Awd1; Felix Frömelt1; Jochen Tenkamp1; Frank Walther2; 1TU Dortmund University, Department of Materials Test Engineering (WPT)

10:00 AM Break

10:20 AM Invited
A Data-driven Approach to Investigate the Influence of Process Parameters on Fatigue Life of Additively Manufactured Metals: Ashley Spear1; Dillon Watring1; Nadia Kouraytem1; 1University of Utah

10:50 AM
Investigating Local Microstructure Response During Crack Initiation and Propagation in DMLS IN718 Subjected to High Cycle Fatigue Loading: Priya Ravi1; Diwakar Naragani1; Michael Sangid1; Jun-Sang Park2; Peter Kenesei3; 1Purdue University; 2Argonne National Laboratory

11:10 AM
Fracture and Fatigue Properties of Titanium Alloy (Ti6Al4V) Parts Made Using Laser Powder Bed Fusion (LPBF) Additive Manufacturing Process: Scott Halliday1; Prahalad Rao1; Jeffrey Shield1; Ashley Spear1; Branden Kappes1; Sandip Harimkar1; 1Navajo Technical University; 2University of Nebraska; 3University of Nebraska-Lincoln; 4University of Utah; 5Colorado School of Mines; 6Oklahoma State University
Fatigue Life Prediction of Additively Manufactured IN718 Using Crystal Plasticity Modeling with Experimental Validation: Veerappan Prithiviraj; Michael Sangid1; Purdue University

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Fe-based Systems

**Sponsored by:** TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, Questek Innovations LLC

**Wednesday AM | March 13, 2019**

221C | Henry B. Gonzalez Convention Center

**Session Chairs:** Suresh Babu, The University of Tennessee; Konstaninos Goulos, Rotterdam Fieldlab Additive Manufacturing / TU Delft

8:30 AM Invited

Cryomilled 17-4 Stainless Steel Powder as Feedstock for Additive Manufacturing: Franklyn Kellogg1; Andelle Kudzial2; Josh Taggart-Scarff1; Ryan Rogers3; Brandon McWilliams2; SURVICE Engineering; US Army Research Laboratory; Bowhead Support

9:00 AM

The Effects of Nitrogen on the Microstructure of Precipitation Hardenable Martensitic Stainless Steels for Additive Manufacturing: Eric Lass2; National Institute of Standards and Technology

9:20 AM

Microstructure Evolution in Direct Metal Laser Sintered Corrax Maraging Stainless Steel: Amir Hadadzadeh1; Babak Salihi-Arminkhiz2; Jian Li2; Mohsen Mohammadi1; Marine Additive Manufacturing Centre of Excellence-University of New Brunswick; CanmetMATMATERIALS-Natural Resources Canada

9:40 AM

Synchrotron X-Ray Imaging of 4140 Steel Laser Powder Bed Fusion: Andrew Bobel1; Anil Sachdev2; Tyson Brown2; Whitney Poling1; Robert Kubic1; Louis Hector1; Tao Sun2; Benjamin Gould1; Aaron Greco1; Isaac Chelladurai2; General Motors Global R&D Center; Argonne National Laboratory; Brigham Young University

10:00 AM Break

10:20 AM

From Powder to Part: On the Microstructural and Phase Stability in Steel Builds: Bij-Na Kim1; David San Martin3; Pedro EJ Rivera-Diaz-del-Castillo1; LPW Technology / Lancaster University; CENIM-CSIC; Lancaster University

10:40 AM

Tailoring Microstructure of Steel Alloys in Selective Laser Melting: Mahdi Jamshidinia1; Behrang Poorganji1; GE Additive

11:00 AM

Controlling Defects and Microstructure Evolution in Single Tracks: Saad Khairallah1; Rongpei Shi1; Jianchao Ye1; Alexander Rubenchik1; Aiden Martin1; Nicholas Cailat1; Tien Roehling1; John Roehling1; Josephn McKeown1; Manyalibo Matthews1; Lawrence Livermore National Laboratory

11:20 AM

Inclusion Evolution in Additively Manufactured 316L Stainless Steel Using Laser Metal Deposition Process: Du-Rim Eo1; Jung-Wook Cho2; Sun-Hong Park2; POSTECH; Research Institute of Industrial Science and Technology(RIST)

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing: Materials Design and Alloy Development — Functional Materials for AM

**Sponsored by:** TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

**Wednesday AM | March 13, 2019**

221D | Henry B. Gonzalez Convention Center

**Session Chairs:** Orlando Rios, Oak Ridge National Laboratory; Minhson Pham, Imperial College London

8:30 AM Invited

Development and Synthesis of Functional Materials via Additive Manufacturing: Ryan Ott1; Emrah Simsek1; Fanqiang Meng1; Ikenne Nlededimi1; Matthew Kramer1; Ames Laboratory

9:00 AM

Mitigating Melt Pool Balling Defects though Alloy Compositional Changes and Processing Changes: Jack Beuth1; Zachary Francis1; Debornita Basu1; Nicholas Jones1; Bryan Webley1; Carnegie Mellon University

9:20 AM

Composition Refinement for Functional Gradient Printing Methodology: Olga Elseева1; Tanner Kirk1; Raymundo Arroyave1; Richard Malak1; Alaa Elwany1; Ibrahim Karaman1; Texas A&M University

9:40 AM

Laser Powder Bed Fusion of Fe-Si Soft-Magnetic Materials: Alex Plotkowsk1; Fred List1; Jason Fries1; Benjamin Stump1; Ryan Dehoff1; Oak Ridge National Laboratory

10:00 AM

Alloy Design for Biomedical Applications in Additive Manufacturing: Kay-Peter Hoyer1; Mirko Schaper1; Paderborn University

10:20 AM Break

10:40 AM Invited

Alloy Design of Ti-based Metallic Glass for Additive Manufacturing and EIGA Processes: Hwi-Jun Kim1; Sung-Uk Hong1; Min-Ha Lee1; Min-Chol Kang1; KITECH

11:10 AM

Additive Manufacturing of Metal Trenching and Excavating Tools for Future NASA Landers: Douglas Hofmann1; Punnathat Bordeenchikasem1; Andre Pate1; Samad Firdosy1; Chris Yahner1; Cecily Sunday1; Morgan Hendry1; NASA JPL/Caltech

11:40 AM

In Situ Alloying of High-entropy Alloy Compositions through Additive Manufacturing: Michael Moorehead1; Kaila Bertsch1; Dan Thomas1; Calvin Parkin1; Adrien Coutel1; Kumar Sridharan1; University of Wisconsin-Madison
12:00 PM
Characterization of Cu-Sn-Ti based Metal-Diamond Composites Fabricated by Selective Laser Melting: Xiaoshuang Li; Adriaan Spiering; Konrad Wegener; Christian Leinenbach; Empa - Materials Science And Technology; Inspire AG; ETH Zurich

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session V

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Wednesday AM | March 13, 2019 302A | Henry B. Gonzalez Convention Center

Session Chairs: Robert Maass, University of Illinois at Urbana-Champaign; Peter Hedstrøm, KTH Royal Institute of Technology

8:30 AM Invited
Characterization of Deformation Behaviour of Fe-Cr-Ni Alloys with Different Austenite Stabilities: Peter Hedstrøm; Ye Tian; Benjamin Neding; KTH Royal Institute of Technology

9:00 AM
Microstructural Evolution of Ti-7Al Under Cyclic Loading: Rachel Lin; Vahid Ta‘i; Darren Pagan; Yufeng Shen; Robert Suter; Anthony Rollett; Carnegie Mellon University; Cornell High Energy Synchrotron Source

9:20 AM
A Temperature Sensitivity Study of Non-proportional Strain-paths Using In Situ X-ray Diffraction: David Collins; Richard Todd; Angus Wilkinson; University of Birmingham; University of Oxford

9:40 AM
Coupling Experiments and Simulation to Understand Local Deformation Mechanism in Ni Micro-wire: Ravi Purushottam; Céline Gérard; Loïc Signor; Abhinav Arya; Girish Bajjawar; Satyam Suwas; Atul Chokshi; Ludovic Thilly; University of Poitiers; Institut Pprime-CNRS-Université de Poitiers-ISAE ENSMA; IISc-Bangalore

10:00 AM Break

10:20 AM Invited
Non-trivial Scaling Exponents of Avalanche in Crystal Plasticity: Robert Maass; University of Illinois at Urbana-Champaign

10:50 AM
Investigation of Improved Ductility in Mg-Ca Alloy through In Situ EBSD and 3DXRD Experiments: Leyun Wang; Gaoming Zhu; Zhounuo Tong; Shanghai Jiao Tong University

11:10 AM
316L Stainless Steel Subjected to Shear: Ramon Martinez; Veronica Livescu; William Blumenthal; Clarissa Yablinsky; Christopher Baxter; Hashem Mourad; Curt Bronkhorst; Los Alamos National Laboratory

11:30 AM
3D Characterization of Nano-scale Precipitates in Shape-memory Alloys: Dexin Zhao; Tejas Umale; Jobin Joy; Ibrahim Karaman; Lagoudas Dimitris; Kelvin Xie; Texas A&M University

11:50 AM
Study of Heterogeneous Deformation and Estimation of Surface Dislocation Density in Hexagonal Titanium: Harsha Phukan; Thomas Bieler; Chen Zhang; Ruqing Xu; Philip Eisenlohr; Martin Crimp; Carl Boehlert; Michigan State University; Argonne National Laboratory

ADVANCED MATERIALS

Advanced High-Strength Steels III — Microstructure, Processing, and Properties of Advanced High-Strength Steels III

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; Mingxin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Wednesday AM | March 13, 2019 205 | Henry B. Gonzalez Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Melissa Thrun, Colorado School of Mines

8:30 AM
In Situ Investigation of the Iron Carbide Precipitation Process in a Fe-C-Mn-Si Q&P Steel: Sebastien Allain; Angeline Poulon-Quintin; Samy Aoued; Magali Bouzat; Michel Soler; Jean-Christophe Hell; Frederic Daniox; Mohamed Gouné; Guillaume Geandier; Institut Jean Lamour / Mines Nancy; ICMCB; ArcelorMittal Maîzières Research; GPIM; Institut Jean Lamour

8:50 AM
Into the Quenching & Partitioning of a 0.2C Steel: an In Situ Synchrotron Study: Pierre Huyghe; Matteo Caruso; Jean-Louis Collet; Sylvain Dépinoy; Stephane Godet; Universite Libre De Bruxelles; CRM Group

9:10 AM
Revealing the Effect of Fast-Heating on the Microstructure and Mechanical Properties of Cold-rolled Q&P Steels: Geng Liu; Hao Chen; Tsinghua University

9:30 AM
Effect of Strain Rate on the Austenite Mechanical Stability in QP980 Steel: Min Wang; Binbin He; Mingxin Huang; The University of Hong Kong

9:50 AM Break

10:10 AM
Micro-mechanics of Plasticity and Damage in 3rd Generation Advanced High Strength Steel: Mei-Mei Wang; Jean-Christophe Hell; Cem Tasan; Max-Plank-Institut für Eisenforschung; ArcelorMittal Global R&D; Massachusetts Institute of Technology

10:30 AM
The Influence of Transformation Induced Plasticity on Damage Development in QP1500: Concetta Pelligrina; Javad Samei; David Wilkinson; McMaster University

10:50 AM
Low Temperature Deformation and Fracture Behaviors of a 1400 MPa Quenching and Partitioning Steel: Zhou Wang; Mingxin Huang; The University of Hong Kong

11:10 AM
Development of Advanced High Strength Steels for Automobile Applications: Francois Bardado; Tien Zhou; David Overby; Peter Badgley; Christopher Martin-Root; Sarah Zhang; Richard Zhang; Research Department, Stelco Inc.
11:30 AM  
Tailoring the Strength and Ductility by Different Transformation Procedures in 0.47C- and 0.19C- TRIP Steels: Yongfeng Shen; Northeastern University

ENERGY & ENVIRONMENT


Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Wednesday AM | March 13, 2019
225B | Henry B. Gonzalez Convention Center
Session Chair: Orlando Rios, Oak Ridge National Laboratory

8:30 AM  
Critical Raw Materials: Current Challenges in Europe and Beyond: Alessandra Hool; ESM Foundation

8:50 AM  
Availability of Raw Materials for Magnets: Short- and Long-term Considerations: Roderick Eggert; Colorado School Of Mines

9:20 AM  
Canadian Rare Earth Elements R&D Program: Janice Zinck; Ian London; Natural Resources Canada, CanmetMINING; Canadian Rare Earth Elements Network (GREEN)

9:50 AM  
Break

10:10 AM  
Accelerated Development of Substitutes for Critical Materials in Clean Energy Technologies: Thomas Lograsso; Ames Laboratory

10:40 AM  
A State of the Art Life Cycle Assessment of Rare Earth Elements: Gwendolyn Bailey; Dieuwertje Schrijvers; Rita Schulze; Anne Marie Slyvestre; James Joyce; Benjamin Sprecher; Ehsan Vahidi; Wim Dewulf; Karel Van Acker; Katholieke University, Leuven; Université de Bordeaux; Leiden University; Lynos; KTH; Purdue University

11:10 AM  
Critical Raw Materials in Nanoelectronic Devices: Atsuumi Hirohata; Günter Reiss; Laszlo Szunyogh; Ulrich Nowak; Koki Takanashi; Kanta Ono; University of York; University of Bielefeld; Budapest University of Technology and Economics; University of Konstanz; Tohoku University; High Energy Accelerator Research Organization

ADVANCED MATERIALS

Advanced Materials and Reservoir Engineering for Extreme Oil & Gas Environments III — Session I

Sponsored by: TMS: Energy Conversion and Storage Committee

Program Organizers: Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver; Partha Ganguly, Baker Hughes GE

Wednesday AM | March 13, 2019
206A | Henry B. Gonzalez Convention Center
Session Chairs: Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver

8:30 AM  
Invited  
What Makes Grain Boundaries Resistant to Hydrogen Embrittlement?: Michael Demkowicz; Texas A&M University

9:00 AM  
Invited  
Integrated Computational Materials Engineering – New Paradigms in Materials Design and Selection for Corrosion: Christopher Taylor; DNV GL USA Inc. and Fontana Corrosion Center, The Ohio State University

9:30 AM  
Life Predictions of Elastomeric Materials Using Compressive Stress Relaxation Test Method: Wayne Furlan; Baker Hughes

9:50 AM  
Coating for Downhole Scale-build Up Prevention: Deepak Kumar; Zhiyue Xu; Baker Hughes, a GE Company

10:10 AM  
Break

10:30 AM  
Invited  
Nanotracers for Oil and Gas Applications: Sankaran Murugesan; Radhika Suresh; Devesh Agrawal; Valery Khabashesku; Qusai Darugar; Baker Hughes

10:50 AM  
Technology Cross-pollination Leads to Design of Flowable Sensors for Reservoir Monitoring: Ting Chen Roy; Ram Shenoy; Indranil Roy; Jing Zhou; WellDiver/SET Laboratories Inc.; WellDiver; Rice University

11:10 AM  
Invited  
Improve Production and Significantly Reduce OPEX: Wayne Furlan; Baker Hughes
ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Advanced Microelectronic Packaging Materials

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Ngigita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Wednesday AM | March 13, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Andre Delhaise, Celestica; Rahul Panat, Carnegie Mellon University

8:30 AM
High Thermally Conducting Polymer-based Films with Magnetic Field-assisted Aligned Hexagonal Boron Nitride for Flexible Electronic Encapsulation: Jie Yuan1; Zhi-Quan Liu1; Institute of Metal Research, Chinese Academy of Sciences

8:50 AM
Soldering of Core-shell Multi-Segment Nanowires for Nanoscale Interconnection: Edward Fratto2; Jirui Wang3; Hongwei Sun3; Zhiyong Gu1; University of Massachusetts Lowell

9:10 AM
Boron Nitride Nanotube-based Composites for Thermal Management: Hannes Schniepp1; The College of William & Mary

9:30 AM
Developing Seed Layer for Electroplating of Vertically Aligned Carbon Nano Tubes: Leila Ladani1; Garrison Frost1; University of Texas at Arlington

9:50 AM Break

10:10 AM
Transient Response of Composite PCMs to Periodic Heat Pulses: Michael Deckard6; Alison Hoe7; Jonathan Felts8; Patrick Shamberger8; Texas A&M University

10:30 AM
The Interaction of Ga-based Alloys and Cu Substrates at Low Temperatures: Shiqian Liu1; Stuart McDonald2; Keith Sweatman2; Tetsuro Nishimura2; Kazuhiro Ngigita2; Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM), School of Mechanical and Mining Engineering, The University of Queensland; Nihon Superior Co., Ltd.

10:50 AM
A Preliminary Study of Oxide Film Break-down during Ultrasonic Wire Bonding: Calvin Tseng1; Panthea Sepehrband1; Santa Clara University

11:10 AM
Study of Thiourea-sulfur Compound Co-deposited in Ni(P) and its Effect on Ni(P) Surface Corrosion: Chen-Yu Wu1; Cheng-Yi Liu1; An-Lun Liu1; Min-Jung Cheng1; Chih-yuan Hsiao1; National Central University; Taiwan Uyemura

CHARACTERIZATION

Advanced Real Time Imaging — Additive Manufacturing and Biomaterials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Nesilhan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Wednesday AM | March 13, 2019
302B | Henry B. Gonzalez Convention Center

Session Chairs: Yongsug Chung, Korea Polytechnic University; Candan Tamerler, University of Kansas

8:30 AM
In Situ Characterization of Hot Cracking Using Dynamic X-ray Radiography: Po-Ju Chiang1; Runbo Jiang1; Ross Cunningham1; Niranjani Parab2; Cang Zhao2; Kamel Fezzaa2; Tao Sun2; Anthony Rollett1; Carnegie Mellon University; Argonne National Laboratory

8:50 AM
High Resolution 4D X-ray Tomography of Dendrite Growth in Aluminum Alloys: Tiberiu Star1; Yue Sun1; Kate Elder1; Xianghui Xiao1; Peter Voorhees1; Northwestern University; Argonne National Laboratory

9:10 AM
Determination of Temperature Distribution in and around the Melt Pool during Laser Powder Bed Fusion by Hyperspectral Thermal Imaging: Nicholas Calta1; Gabe Guss1; Dongxia Qu1; Saad Khairallahi1; Manyalibo Matthews1; Lawrence Livermore National Laboratory

9:30 AM
New Insights on Liquid Metal Breakup from High Speed Image Analysis during Close Coupled Gas Atomization: Jordan Tiarks1; Trevor Riedemann1; Emma White1; Iver Anderson1; U.S. Department of Energy, Ames Laboratory

9:50 AM Break

10:10 AM
Analysis of Chlorpropamide’s Polymorphic Transformation Using In Situ Mechanical Raman Spectroscopy during Tableting: Vikas Kumar Reddy1; Hetal Patel1; Jordan Tomar1; Arizona State University; Dongxia Qu1; Purdue University

10:30 AM
High-frequency Ultrasound Analysis in Both Experimental and Computation Level to Understand the Microstructural Change in Soft Tissues: Leila Ladani1; Koushik Paul1; Jeremy Stromer1; University of Texas at Arlington; University of Connecticut
MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Computational Modeling of Failure: Novel Methods

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Wednesday AM | March 13, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Amine Benzerga, Texas A&M University; Katsuyo Thornton, University of Michigan

8:30 AM Introductory Comments

8:35 AM Invited
A New Automated Computational Framework for Simulating the Failure Response of Materials with Complex Microstructures: Soheil Soghrati1; Anand Nagarajan1; Ming Yang2; Bowen Liang3; Hossein Ahmadian3; Weijie Mai3; 1The Ohio State University

9:05 AM Invited
A Parameter-free Top-down Approach to Ductile Fracture Simulations: Amine Benzerga1; 1Texas A & M University

9:35 AM Invited
A Nonlinear Dynamics Approach to Oxide Breakdown in the Stochastic Model of Zirconium Alloy Corrosion: Richard Smith1; 1Naval Nuclear Laboratory

9:55 AM Break

10:15 AM Invited
Computational Modeling of Fracture in Ceramic Nuclear Fuel: Comparison of Methods and Validation Needs: Benjamin Spencer1; Wen Jaing1; Hailong Chen1; 1Idaho National Laboratory

10:45 AM Invited
The Smoothed Boundary Method for Mechanics of Anisotropic Materials for Energy Storage: Alexander Chadwick1; Doa A Taha1; Erik Hanson1; Hui-Chia Yu2; Katsuyo Thornton3; 1University of Michigan; 2Michigan State University

11:15 AM Invited
Engineering Microcracked Ceramic Metamaterials: Ryan Cooper1; 1University of Connecticut

11:35 AM Invited
Design of Supercompressible Material by Artificial Intelligence and Additive Manufacturing: Miguel Bessa1; 1Delft University of Technology

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Atomistic and Mesoscale Algorithms in Study and Design of Materials


Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Logan Spieker, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srujana, University of North Texas

Wednesday AM | March 13, 2019
304A | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Vahe Tari, Eaton Corporate Research & Technology

8:30 AM Invited
Coupling CPFEM with Phase Field Modeling from Crack Propagation in Polycrystalline Materials: Somnath Ghosh1; Jiahao Cheng1; Ahmad Shahba1; 1Johns Hopkins University

9:00 AM
A Phase Field Model for Dislocation Evolution in Heterogeneous Media: Shuozhi Xu1; Abigail Hunter2; Irene Beyerlein3; 1University Of California, Santa Barbara; 2Los Alamos National Laboratory

9:20 AM
Algorithm to Include Inertia in FFT-based Micromechanical Modelling of Heterogeneous Materials: Ricardo Lebensohn1; 1Los Alamos National Laboratory

9:40 AM
Multi-Information Source Fusion and Optimization to Realize ICME: Application to Dual Phase Materials: Seyede Ghoreishi1; Abhilash Molkeri1; Raymundo Arroyave1; Douglas Allaire1; Ankith Srivastava1; 1Texas A&M University

10:00 AM Break

10:30 AM
Extension of SPPARKS’ Hybrid Potts-phase Field Model to Include Anisotropic Grain Boundaries: Efrain Hernandez-Rivera1; Philip Goin1; Philip Goin1; Heath Murdock1; 1US Army Research Laboratory

10:50 AM
A Crystal Plasticity Model for Dynamic Recrystallization in Ti-6Al-4V Alloy: Arunobha Mohan Roy1; Riddhiman Bhattacharyya1; John Allison1; Veera Sundararaghavan1; 1University of Michigan-Ann Arbor

11:10 AM
Numerical Simulation of Ti6-Al4-V Alloy Diffusion Bonding Process Based on Molecular Dynamics: Xiaogang Liu1; Hailing Guo1; Yongji Zuo1; 1College of Energy and Power Engineering, Nanjing University of Aeron and Astro

11:30 AM
Scaling Relationships to Model the Evolution of Microstructure of Metallic Powder Particles at the Mesoscales Using Quasi-Coarse-Grained Dynamics Simulations: Avinash Dongare1; 1University of Connecticut
**ELECTRONIC MATERIALS**

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session V

*Sponsored by*: TMS: Alloy Phases Committee

*Program Organizers*: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, ENSICAEN University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Morii, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

*Wednesday AM | March 13, 2019 |

216B | Henry B. Gonzalez Convention Center

*Session Chairs*: Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University

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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>Invited Tuning Transition Metal Dichalcogenide Heterostructure</td>
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<tr>
<td>8:50 AM</td>
<td>Invited Strain Tuning of Thermoelectric Properties of 2D TMDCs: The Case of TiSe2: Safoura Nayebsadeghi; Mona Zebjaradi; Keivan Esfarjani</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>Invited Applications of Aberration-corrected TEM on Thermoelectric Materials: Binghui Ge; Yumei Wang; Anhui University; Institute of Physics, CAS</td>
</tr>
<tr>
<td>9:30 AM</td>
<td>Intrinsic Phase Stability and Microstructural Evolution of Elastically Stressed Mg2SixSn1-x Thermoelectric System: Vahid Attar; Su-In Yi; Chongho Yu; Raymundo Arroyave; Texas A&amp;M University</td>
</tr>
<tr>
<td>9:50 AM</td>
<td>Phonon Spectroscopy in Inhomogenous Materials: Raphael Hermann; Oak Ridge National Laboratory</td>
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<tr>
<td>10:10 AM</td>
<td>Break</td>
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<tr>
<td>10:30 AM</td>
<td>Invited Effects of Vacancy-site Occupancy on Thermoelectric and Mechanical Properties of Half-Heusler ZrNiSn and Zr(Ni,Co)Sn: Yoshisato Kimura; Yaw Wang Chai; Tokyo Institute of Technology</td>
</tr>
<tr>
<td>10:50 AM</td>
<td>Invited Screening Promising Thermoelectric Materials in Binary Chalcogenides through High-Throughput Computations: Yongsheng Zhang; Institute Of Solid State Physics, Cas</td>
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<tr>
<td>11:10 AM</td>
<td>Invited Computational Screening of Tens of Thousands of Compounds as Potential Thermoelectrics and their Experimental Followup: Anubhav Jain; Lawrence Berkeley National Laboratory</td>
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<tr>
<td>11:30 AM</td>
<td>Mechanical Characterization and Microstructural Evolution of Reactively-brazed Half-Heusler/Incusil ABA/Copper Interfaces: Sonika Gahlawat; Kenneth White; University of Houston</td>
</tr>
<tr>
<td>11:50 AM</td>
<td>In Situ TEM Study of Transition Metal Oxides Based Hole-selective Contacts Employed in Silicon Solar Cells: Haider Ali; Supriya Koul; Geoffrey Gregory; Akihiro Kushima; Kristopher Davis; University of Central Florida</td>
</tr>
</tbody>
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**LIGHT METALS**

Alumina & Bauxite — Bayer Process and Non-conventional Processing

*Sponsored by*: TMS Light Metals Division, TMS: Aluminum Committee

*Program Organizer*: Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

*Wednesday AM | March 13, 2019 |

006A | Henry B. Gonzalez Convention Center

*Session Chairs*: Roberto Seno, Companhia Brasileira de Aluminio (CBA); Lance Myers, Alcoa; James Vaughan, University of Queensland; Marie-Louise Bouchard, Rio Tinto

<table>
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<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>Introductory Comments</td>
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<tr>
<td>8:35 AM</td>
<td>Advances in Beneficiation of Low-grade Bauxite: Lala Sukla; Archana Pattanaik; Debabrata Pradhan; Siksha ‘O’ Anusandhan University</td>
</tr>
<tr>
<td>9:00 AM</td>
<td>Leaching Kinetics of Thermally-activated, High Silica Bauxite: Hong Peng; Steven Peters; James Vaughan; University of Queensland; University of Bath</td>
</tr>
<tr>
<td>9:25 AM</td>
<td>Rheological Improvements in Alumina Industry Clarification Circuits: Lawrence Andermann; Adrian Mullins Mullins; Cameron Smyth; Clive Roscoe; Solenis; Rio Tinto Aluminum</td>
</tr>
<tr>
<td>9:50 AM</td>
<td>Improving the Reliability of Fluidized Bed Alumina Calciners by Suitable Refractory Lining Selection: Mariana Braulio; Jose Cunha; Austin Maxwell; Dean Whiteman; Victor Pandolfelli; 4cast Materials Consultancy; Alcoa; Federal University of Sao Carlos</td>
</tr>
<tr>
<td>10:15 AM</td>
<td>Break</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Keynote Valorization of Bauxite Residue: A Challenge That Leads to a Mentality Shift and Eventually Innovation: Yiannis Pontikes; KU Leuven</td>
</tr>
<tr>
<td>11:10 AM</td>
<td>Synchronous Desulfurization and Desilication of Low-grade and High-sulfur Bauxite by a Flotation Process: Wencui Chai; Guihong Han; Yanfang Huang; Yijun Cao; Jiongtian Liu; Zhengzhou University</td>
</tr>
<tr>
<td>11:35 AM</td>
<td>Preparing Alumina by Electrolytic Method from Sulfuric Acid Leachate of Coal Fly Ash: Yuan Shi; Kai-xi Jiang; Zhang Tingan; Guo-zhi Lyu; Northeastern University</td>
</tr>
</tbody>
</table>
LIGHT METALS

Aluminum Alloys, Processing and Characterization — Simulations and Studies of Processing

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

Wednesday AM | March 13, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Hiromi Nagaumi, Soochow University

8:30 AM Introductory Comments

8:35 AM
Coupled Fluid Flow and Heat Transfer Analysis of Ageing Heat Furnace: Mircea Popa1; Ioan Sava1; Marin Petre1; Catalin Ducu2; Sorin Moga2; Alexandra Necola1; Constantin-Nicușor Drăghici1; 1ALRO; 2University of Pitesti

9:00 AM
The Influence of the Distance Between the Plate and the Top Nozzles during the Soft Quenching Process of the 6061 Aluminium Alloy Plates: Gheorghe Dobra1; Ioan Sava1; Carmen Stanica2; Marin Petre1; Catalin Ducu2; Sorin Moga2; Cristian Florescu1; 1ALRO; 2University of Pitesti

9:25 AM
Numerical Investigation on the Motion of Free-floating Crystals during DC Casting of Aluminium Alloys: Olawale Fatoba1; Esther Akinlabi1; Stephen Akinlabi1; Mutiu Eriñosho1; 1University of Johannesburg

9:50 AM
Numerical Modelling, Microstructural Evolution and Characterization of Laser Cladded Al-Si-Sn Coatings on Ti-6Al-4V Alloy Plates: Olawale Fatoba1; Esther Akinlabi1; Stephen Akinlabi1; Mutiu Eriñosho1; 1University of Johannesburg

10:05 AM
Numerical Investigation on the Motion of Free-floating Crystals during DC Casting of Aluminium Alloys: Olawale Fatoba1; Ioan Sava1; Cristian Stanescu1; Catalin Ducu2; Sorin Moga2; Decebal Dorin Balasoiu1; Dan Ion Paun1; 1ALRO; 2University of Pitesti

10:35 AM
Numerical Modelling, Microstructural Evolution and Characterization of Laser Cladded Al-Si-Sn Coatings on Ti-6Al-4V Alloy Plates: Gheorghe Dobra1; Ioan Sava1; Marin Petre1; Catalin Ducu2; Sorin Moga2; Cristian Florescu1; 1ALRO; 2University of Pitesti

10:55 AM
Characteristics of Surface Properties of Aluminum Flat Products Related with Different Annealing Temperature and Cleaning Properties: Emel Çalışkan1; Kaan Ipek1; Ahmet Seisoglu1; Erdem Güler1; Ali Ulus1; 1Teknik Alüminyum San. Tic. A.S.

11:20 AM
Comparative Electrochemical and Intergranular Corrosion-resistance Testing of Wrought Aluminium Alloys: Varuzan Kevorkjan1; Irena Lesjak1; Marko Degiampietro1; Lucija Skledar1; Teja Krumpak1; 1Impol R in R d.o.o.

11:45 AM
Nature of Grain Boundary Precipitates and Stress Corrosion Behavior in Al 7075 and 7079 Alloys: Ramasis Goswami1; 1Naval Research Laboratory

LIGHT METALS

Aluminum Reduction Technology — Joint Session with Electrode Technology

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Marc Dupuis, GeniSim Inc

Wednesday AM | March 13, 2019
004 | Henry B. Gonzalez Convention Center

Session Chairs: Ali Jassim, EGA; Bjørn Petter Moxnes, Hydro Aluminium Sunndal Metal Plant

8:30 AM Introductory Comments

8:35 AM
Dry Barrier Powder Performance Update: Richard Jeltsch1; 1Jeltsch Consulting

9:00 AM
Investigation of Refractory Degradation in Hall-Héroult Cell: Bhavya Narang1; Sharmuith Rajgire2; Amit Gupta2; Mahesh Sahoo3; J.P. Nayak2; 1Aditya Birla Science and Technology Company Pvt. Ltd.; 2Hindalco Industries Ltd.; 3Northeastern University; 1University of Johannesburg

9:25 AM
Thermogravimetric Analysis of Thermal Insulating Materials Exposed to Sodium Vapor: Raymond Luneng1; Zhaohui Wang1; Arne Petter Ratvik1; Tor Grande1; 1Norwegian University of Science and Technology; 2SINTEF Industry

9:50 AM Break

10:05 AM
Innovative Anode Coating Technology to Reduce Anode Carbon Consumption in Electrolysis Cells: Ali Jassim1; Najeeba Al Jabri1; Saleh Ahmed Rabbaa1; Edouard Gerard Mofor1; Jamil Jamal Wazir Eddin1; 1EGA

10:30 AM
Theory and Practice of High Temperature Gas Baking Technology for Aluminium Electrolysis Cells: Xuoding Wang1; Yingwu Li1; Chengbo Wu1; Yinbo Zhang1; 1Zhengzhou Jingwei Technology Industry Co., Ltd

10:55 AM Concluding Comments
BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces IV

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

**Wednesday AM | March 13, 2019**
217C | Henry B. Gonzalez Convention Center

**Session Chairs:** Hendrik Heinz, University of Colorado; Candan Tamerler, University of Kansas

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8:30 AM Invited  
Structure / Property Relationships in Biomaterials at the Nanoscale. **Federico Rosei**; ¹INRS Centre for Energy, Materials and Telecommunications

9:00 AM  
Nanoclusters with T1 MRI Enhancement for Imaging-guided Drug Delivery: **Yuping Bao**; ¹University of Alabama

9:20 AM Invited  
Nanostructured Diamond for Medical Device Applications: **Roger Narayan**; ²University of North Carolina

9:50 AM  
Engineered Peptide Coupled Polymer Composites for Antimicrobial Adhesive-dentin Interface: **Sheng-Xue Xin**, Kyle Boone¹; Leon Song¹; Sarah VanOosten¹; Paulette Spencer¹; Candan Tamerler¹; ²University of Kansas

10:10 AM Break

10:30 AM Keynote  
Phase-change Materials for Controlled Release and Related Biomedical Applications: Da Huo³; Jiajia Xue³; Chunlei Zhu³; Younan Xia³; ³Georgia Institute of Technology and Emory University

11:10 AM  
Adhesion of Neuron-like Cells on Single-layer MoS2 towards Electrical Detection of Cell Activity: **Kazuki Yatsu**; Tomoko Ohnishi³; Takakazu Seki³; Hironaga Noguchi³; Sayaka Tezuka³; Yuhei Hayamizu³; ³Tokyo Institute of Technology

11:30 AM Invited  
Interdisciplinary Strategies for Engineering at Nanoscale: **Handan Acar**; ²Stephenson School of Biomedical Engineering, University of Oklahoma

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Synthesis and Mechanical Properties

**Sponsored by:** TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfai Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

**Wednesday AM | March 13, 2019**
206B | Henry B. Gonzalez Convention Center

**Session Chair:** Juergen Eckert, Erich Schmid Institute of Materials Science; Xie Xie, FCS US LLC

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8:30 AM Keynote  
Mechanical Measurements on Colloidal Crystals and Glasses: J. Terdik³; David Weitz³; Frans Spaepen³; ²Harvard University

9:00 AM Keynote  
Improving the Tensile Ductility of Bulk Metallic Glasses by Controlling Heterogeneities: **Jurgen Eckert**³; ²Erich Schmid Inst of Materials Science

9:30 AM Keynote  
Determining Metastable Phases in Metallic Alloys via Ultrafast Calorimetry: **Jörg Löffler**³; ²ETH Zurich

10:00 AM Invited  
Synthesis and Properties of BMG Type Nanoglasses by Thin Film Deposition in Comparison with HPT: **Hans Fecht**³; ²Ulm University

10:20 AM Break

10:40 AM Invited  
Deformation of Bulk Metallic Glasses: Strain Softening or Hardening?: **Je Parr**³; Yi Li³; ²Chinese Academy of Sciences, Institute of Metal Research

11:00 AM Invited  
Super High Dense Zr-based Bulk Metallic Glass Induced by High Pressure Treatment over Tg: **Rui Yamada**²; Yuki Shibazaki²; Yasuto Abe²; Wookha Ryu²; Junji Saida²; ²Frontier Research Institute for Interdisciplinary Sciences, Tohoku University; ³National Institute for Materials Science

11:20 AM Invited  
Small-scale Plasticity of Quasicrystals: Similarity and Difference from Metallic Glasses: **Yu Zou**³; ²University of Toronto

11:40 AM  
Surface Patterning by Thermoplastic Forming of Ni-free Ti-based Bulk Metallic Glasses: **Mariana Calin**²; Supriya Bera²; Baran Sarac²; Juergen Eckert³; ²IFW Dresden; ²Austrian Academy of Sciences; ³Austrian Academy of Sciences

12:00 PM Invited  
Overcoming the Ductility and Strength Trade-off via Precise Controlling of Microstructure of Al-based Glassy Alloys: **Wan Kim**³; Eun Soo Park³; ²Seoul National University

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**LIGHT METALS**

Cast Shop Technology: Energy Joint Session — Cast Shop Technology: Energy Joint Session

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Pierre-Yves Menet, Constellium Technology Center; Mark Jolly, Cranfield University; Valmiro Sa Neto, Praxair Inc; Cynthia Belt, Metals Energy Management LLC

**Wednesday AM | March 13, 2019**

**007B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Cynthia Belt, Metals Energy Management LLC; Mark Jolly, Cranfield University

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**8:30 AM** Introductory Comments

**8:35 AM**

Aluminium Holding Furnace Optimal Design Using the CFD Method and Factorial Approach: Mohamed Hassan; Saeed Alshehhi; Cindy Belt; Khalifa University of Science and Technology; Khalifa University of Science and Tech; Metals Energy Management LLC

**9:00 AM**

Artificial Intelligence to Optimize Melting Processes: An Approach Combining Data Acquisition and Modeling: Amin Rostamian; Stéphane Lesquerreux; Marc Bertherat; Michel Rappaz; Novamet SàRL; GAP Engineering SA; Constellium; MRC-Consulting Michel Rappaz

**9:25 AM**

Oxy-fuel Technologies for Improved Efficiency in Aluminum Scrap Melting: Xavier Paubel; Stewart Jepson; Frank Rheker; Sarah Juma; Dietmar Wieck; William Ollerton; AIR LIQUEIDE; AIRGAS

**9:50 AM**

Break

**10:05 AM**

Electromagnetic Transfer and Circulation (ETAC) of Molten Aluminium Metal and Its Alloys: Robert Fritzsch; Jim Grayson; Pyrotek, EMP Technologies Limited

**10:30 AM**

Optimized Electromagnetic Stirring in Aluminium Melting and Holding Furnaces: Joakim Andersson; ABB Ab

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**CHARACTERIZATION**

Characterization of Materials through High Resolution Imaging — Imaging I

**Sponsored by:** TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

**Wednesday AM | March 13, 2019**

**303A | Henry B. Gonzalez Convention Center**

**Session Chair:** Xianghui Xiao, Argonne National Laboratory

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**8:30 AM** Invited

Ultra-high-speed X-ray Imaging for Studying Materials Structure Dynamics: Too Sun; Kamel Fezzaa; Argonne National Laboratory

**9:00 AM** Invited

Advances in Fatigue Crack Growth Characterization via In Situ Phase Contrast Tomography Imaging: Michael Sangid; Michael Waddell; Stephen Carter; Kevin Walker; Xianghui Xiao; Purdue University; Defence Science and Technology Group; Argonne National Laboratory

**9:20 AM**

In Situ Loading of Engineered Materials during X-ray 3D Tomographic Imaging: Brian Patterson; Kevin Henderson; Nikolaos Cordes; Matthew Herman; Lindsey Kuettnner; Trevor Shear; Cynthia Welch; Paul Welch; Axinte Ionta; Nikhilesh Chawla; Jason Williams; Kamel Fezzaa; Tao Sun; Xianghui Xiao; Los Alamos National Laboratory; Arizona State University; Argonne National Laboratory

**9:40 AM** Invited

Bridging Nano- and Micro-scales in Electrochemical Energy Technologies with X-ray Computed Tomography: Iryna Zenyuk; University of California Irvine

**10:00 AM**

Break

**10:20 AM** Invited

Recent Development of Full-field X-ray Microscope at NSLS-II - A Case of Battery Research: Mingyuan Ge; David Scott Coburn; Evgeny Nazaretski; Kazimierz J. Gofron; Huijuan Xu; Weihe Xu; Zhijian Yin; Wah-Keat Lee; Brookhaven National Laboratory

**10:40 AM** Invited

Revealing the Growth Dynamics of Nature’s Forbidden Crystals: Insung Han; Nancy Senabulya; Haiping Sun; Xianghui Xiao; Ashwin Shahani; University of Michigan; Argonne National Laboratory

**11:00 AM** Invited

X-ray Coherent Surface Scattering Imaging for Surface 3D Imaging and Material Characterization: Miaoqi Chu; Zhang Jiang; Tao Sun; Jin Wang; Advance Photon Source

**11:20 AM** Invited

Identification and Visualization of Chemical Outliers through Scientific Data Mining in Nanoscale Spectro-microscopic Study of NMC Electrode: Enyuan Hu; Yijin Liu; Xiao-Qing Yang; Brookhaven National Laboratory; SLAC National Accelerator Laboratory; Brookhaven National Laboratory
CHARACTERIZATION


Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CamnetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Huang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday AM | March 13, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Shadia Ikhmayies, Al Isra Univeristy; Tomoko Sano, Army Research Laboratory

8:30 AM Introductory Comments

8:35 AM
Estimating the Thermal Conductivity of Uranium and Uranium –Zirconium Alloys with High Porosity: Luis Ortega1; Karyn Stern2; Brandon Blamer2; Sean McDeavitt2; 1Texas A&M University; 2X Energy LLC

8:55 AM
Nanoindentation of Commercial PVD Hard Coatings at Elevated Temperatures and High Strain Rates: Kurt Johanns1; Warren Oliver1; 1Nanomechanics Inc

9:15 AM
Measurement of Hydrogen Vapor Pressure over Two-phase Zirconium/Zirconium Hydride Material between 300°C and 450°C: Kenneth Geelhood1; Walter Luscher2; 1Pacific Northwest National Laboratory

9:35 AM
Characterization of Modified Nickel Silicate Anode Material for Lithium Ion Batteries: Yunyun Wu1; Guihong Han1; Yanfang Huang1; Duo Zhang1; 1Zhengzhou University

9:55 AM Break

10:10 AM
The Influence of Microstructure and Emissivity of NiO Doped Fe3O4 Spinel Structure on Near and Middle Infrared Radiation: Jian Zhang1; Hao Bai2; Xu Zhang1; Huanmei Yuan1; Zefei Zhang1; Liyun Yang1; 1University of Science and Technology

10:30 AM
Preparation and Characterization of PBAT/PLA Biofoams Reinforced with Bio Calcium Carbonate: Elizabeth Cordoso1; Sandra Scagliusi1; Duclerc Parra1; Ademar Lugão1; 1Ipen - Instituto De Pesquisas Energetica

10:50 AM
Incorporation of Silver Nanoparticles in Zinc Oxide Matrix In Polyester Thermoplastic Elastomer (TPE-E) Aiming Antibacterial Activity: Leonardo Marchini1; Duclerc Parra1; Vijaya Rangari1; 1IPEN

11:00 AM
Elucidating Reaction Mechanisms for the Synthesis of SIC-based Composite Matrices: Ravit Silverstein1; Frank Zok2; Carlos Levi2; 1Materials Department, University of California, Santa Barbara, California

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Big Data

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca TavaZZa, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

Wednesday AM | March 13, 2019
305 | Henry B. Gonzalez Convention Center

Session Chairs: Ankit Agrawal, Northwestern University; Huan Tran, University of Connecticut

8:30 AM Invited
Machine Learning of Materials Synthesis by Data Extraction from over 3 Million Research Papers: Gerbrand Ceder1; 1University of California, Berkeley

9:00 AM
Application of Natural Language Processing to TMS Abstracts to Understand the Direction of Computational Materials Design: Efrain Hernandez-Rivera1; Jason Hattnick-Simpers2; Brian DeCost3; Amy Trost4; Aaron Kusne5; 1U.S. Army Research Laboratory; 2National Institute of Standards and Technology; 3University of Maryland

9:20 AM Invited
Materials Informatics and Big Data: Realization of 4th Paradigm of Science in Materials Science: Ankit Agrawal1; Alok Choudhary2; 1Northwestern University

9:50 AM
Investigation of Deformation Twinning in Mg Alloy during In-situ Compression Using Clustering and Computer Vision: Zhe Chen1; Samantha Daly1; 1University of California, Santa Barbara

10:10 AM Break

10:30 AM Invited
Polymer Genome: An Informatics Platform for Rational Polymer Dielectrics Design and Beyond: Rampi Ramprasad1; 1Georgia Tech

11:00 AM
Materials Science Learning and Discovery from Large-scale Text Mining: Leigh Weston1; Vahe Tshitoyan2; John Dagdelen3; Kristin Persson4; Gerbrand Ceder5; Anubhav Jain5; 1Lawrence Berkeley National Laboratory

11:20 AM
Materials Platform for Data Science: From Big Data towards Materials Genome: Evgeny Blokhin1; Pierre Villars2; 1Tilde Materials Informatics; 2Material Phases Data System

11:40 AM
Cloud-based Infrastructure for Big Data in the Materials Domain: David Elbert1; Nick Carey2; Tamas Budavari3; Gerard Lemson4; Alex Szalay5; Tyrel McQueen6; 1Johns Hopkins University
MATERIALS DESIGN

Computational Materials Discovery and Design — Computational Methods for Materials Discovery and Design II

*Sponsored by:* TMS: Computational Materials Science and Engineering Committee

*Program Organizers:* Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

**Wednesday AM | March 13, 2019**

**304C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Prasanna Balachandran, University of Virginia; Arunima Singh, Arizona State University

8:30 AM Invited

**Microstructure Stabilization and the Herring Condition:** Jeremy Mason1; Erdem Eren1; 1University of California, Davis

8:50 AM Invited

**Interpretable Machine Learning for Polycrystal Plasticity Micromechanics:** Ankita Mangal1; Elizabeth Holm1; 1Carnegie Mellon University

9:10 AM

**Predicting Small-scale Plasticity in Single Crystal Micropillars via Machine Learning:** Jamie Gravell1; Junho Cho1; Seungjoon Lee2; Ill Ryu1; 1University of Texas at Dallas; 2John Hopkins University

9:50 AM Break

10:10 AM

**Intrinsic Ductility of Alloys from Nonlinear Elasticity Theory:** Ian Winter1; Daryl Chrzan1; 1University Of California Berkeley

10:30 AM

**The Representation of Five-parameter Grain Boundary Functions Using Harmonics:** Srikanth Patala1; Jeremy Mason1; 1North Carolina State University; 2University of California Davis

10:50 AM

**New Spectral Graph Theoretic Metrics for Grain Boundary Network Design:** Christopher Adair1; Oliver Johnson1; 1Brigham Young University

11:10 AM

**3D Reconstruction of Microstructure from Surface Images Using Graph Theoretic Approaches:** Siddhartha Srivastava1; Iman Javaheri1; Veera Sundararaghavan1; 1University Of Michigan

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Prediction and Stability

*Sponsored by:* TMS: Computational Materials Science and Engineering Committee

*Program Organizers:* Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

**Wednesday AM | March 13, 2019**

**225C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Joel Berry, University of Pennsylvania; Maryam Ghazisaeidi, Ohio State University

8:30 AM Invited

**Multi-cell Monte Carlo (MC)^2 Method for Phase Prediction in Multicomponent Alloys:** Maryam Ghazisaeidi1; Changning Ni2; 1Ohio State University; 2University Of Calfifornia Berkeley

9:00 AM

**Investigation of Al-Co-Fe and Al-Cu-Fe Phase Diagrams over the Whole Composition Range:** Lijong Zhu1; Sujelly Soto-Medina1; Richard Hennig1; Michele Manuel1; 1University of Florida

9:20 AM

**Finding the Zeta Phase:** Christopher Weinberger1; Hang Yu1; Xiaoxiang Yu1; Gregory Thompson1; 1Colorado State University; 2Drexel University; 3University of Alabama

9:40 AM

**Re-visit to Cu-Au First-principles Thermodynamics:** Tetsuo Mohri1; 1Tohoku University

10:00 AM

**Reassessment of Zn-rich Corner Phase Diagrams in the Zn-Fe-Al Ternary System:** Inho Lee1; Kwangsik Han1; Ikku Ohnuma2; Ryosuke Kainuma1; 1Tohoku University; 2National Institute for Materials Science (NIMS)

10:20 AM Break

10:40 AM Invited

**The Formation and Structure of Fe-Mn-Ni-Si Solute Clusters Understanding of D022 Ordering and Stability of Cu 3 Cu-Al Binary Alloys:** Choong-un Kim1; Khaled Hirmas1; 1University of Texas, Arlington

11:10 AM

**Theoretical Calculation of Thermodynamic Properties of Liquid Transition-metal Alloys with Perturbation Theory:** Shun Ueda1; Kazuki Morita1; 1University of Tokyo

11:30 AM

**Understanding of DQ Ordering and Stability of Cu Al Phase in Cu-Al Binary Alloys:** Choong-un Kim1; Khaled Hirmas1; 1University of Texas, Arlington
MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Superalloys: Microstructural Evolution and Advanced Characterization

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detroid, National Energy Technology Laboratory

**Wednesday AM | March 13, 2019**
301C | Henry B. Gonzalez Convention Center

**Session Chairs:** Qiang Feng, University of Science and Technology Beijing; Jonathan Cormier, Institut Pprime - Département de Physique et Mécanique des Matériaux

8:30 AM Invited
Role of Micro-pores in Single Crystal Nickel-based Superalloys: Jian Zhang; 1Institute of Metal Research

9:00 AM
Effects of Mo Additions on gamma-Ni/eta-Ni3Ti Lattice Mismatch in Nickel-base Alloys: Satoru Kobayashi; 1Tokyo Institute of Technology

9:20 AM
Overheating Effects on Microstructural Evolution and Non-isothermal Creep Behavior of a Directionally Solidified Superalloy: Wenrui An; Satoshi Utada; Xiaotong Guo; Weiiwei Zheng; Jonathan Cormier; Qiang Feng; 1University Science and Technology Beijing; 2ENSA - Institut Pprime - UPR CNRS 3346

9:40 AM
Microstructure Evolution and Recrystallization during Creep Loading on Pre-deformed Ni-based SX Superalloy: Satoshi Utada; Jonathan Cormier; Patrick Villechaize; Florence Hamon; Sarah Hamadi; Joël Delautre; 1ISAE-ENSMA/Institut Pprime; 2SAFRAN Aircraft Engines; 3ISAE-ENSMA/Institut Pprime; 1SAFRAN Aircraft Engines

10:00 AM Break

10:20 AM Invited
Understanding Deformation Mechanisms in Superalloys through Atomic Scale Microanalysis: Paraskevas Kontis; Surendra Makineni; Xiaoxiang Wu; Jaber Mianroodi; Pratheek Shanthraj; Jonathan Cormier; Dierk Raabe; Baptiste Gault; 1Max-Planck-Institut für Eisenforschung GmbH; 2School of Materials, The University of Manchester; 1Institut Pprime, Physics and Mechanics of Materials Department

10:50 AM
Residual Stress Relaxation in Ni-based Superalloys at High Temperature by real-time Neutron Diffraction: Yan Chen; Iuliana Cermatescu; Robert Goetz; Alexandru Stoica; Lee Semiatin; Ke An; 1Oak Ridge National Laboratory; 2Pratt & Whitney; 3U.S. Air Force Research Laboratory

11:00 AM
Quantifying Stress Relaxation of a Single Crystal Nickel-base Superalloy during Casting Relevant Thermal Cycles: David Collins; Neil D’Souza; Ayan Bhowmik; Chinnapat Panwisawas; 1University of Birmingham; 2Rolls-Royce plc; 3Rolls-Royce@NTU Corporate Lab, Nanyang Technological University; 4University of Oxford

11:30 AM
Tensile Properties and Fracture Behavior of ATI 718Plus Alloy at Room and Elevated Temperatures: Michael Kattoura; Gopal Viswanathan; Seetha Ramaiah Mannava; Dong Qian; Vijay Vasudevan; 1University of Cincinnati; 2Ohio State University; 3University of Texas at Dallas

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement II

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

**Wednesday AM | March 13, 2019**
214C | Henry B. Gonzalez Convention Center

**Session Chairs:** John Scully, University of Virginia; Brian Somerday, Southwest Research Institute

8:30 AM Invited
Insights Regarding Hydrogen Embrittlement Susceptibility and Mitigation in Structural Materials through Improved Understanding of Hydrogen-metal Interactions: John Scully; 1University of Virginia

9:10 AM
The Relationship between Overpotential and Hydrogen Content in Pure Ni under Electrochemical Charging: Lai Jiang; Michael Demkowicz; 1Texas A&M University

9:50 AM
Effect of Hydrogen and Aging Condition on the Deformation and Fracture Behavior of a Precipitation-hardened Ni-base Superalloy: Zachary Harris; Michael Ritzo; Sean Agnew; James Burns; 1University of Virginia

10:10 AM Invited
A Comprehensive View of Gaseous Hydrogen-assisted Cracking: Brian Somerday; 1Southwest Research Institute

10:50 AM
The Effect of Stress State on Hydrogen Embrittlement in Alloy 718: Fassett Hickey; 1Southwest Research Institute

11:30 AM
The Effect of Hydrogen and Aging Condition on the Deformation and Fracture Behavior of a Precipitation-hardened Ni-base Superalloy: Zachary Harris; Michael Ritzo; Sean Agnew; James Burns; 1University of Virginia
MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Fatigue Characterization Using Advanced Experimental Methods in 2D and 3D

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Wednesday AM | March 13, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Antonios Kontsos, Drexel University

8:30 AM
3D Characterization of Microtexture in Ti64: Joseph Wendorff; Jean-Charles Stinville; Andrew Potolsky; McLean Echlin; Tresa Pollock. 1University of California, Santa Barbara

8:50 AM
High Cycle Thermal Fatigue of Austenitic Stainless Steel Investigated via Hybrid Multiview Correlation: Yajun Wang; François Hild; Ludovic Vincent. 2Université Paris-Saclay

9:10 AM
High Cycle Fatigue in Microcompression of Gamma-TiAl Using Digital Image Correlation Strain Mapping: Thomas Edwards; Fabio Di Gioacchino; Amy Goodfellow; William Clegg. 3Swiss Federal Laboratories for Materials Science and Technology (EMPA); 2University of Cambridge

9:30 AM
Nucleation of Persistent Slip Bands and Crack Initiation in Fatigue of FCC Microcrystals: Steven Lavenstein; Jaafar El-Awady. 1Johns Hopkins University

9:50 AM Break

10:10 AM
Quantitative Measurements of Cyclic Slip Irreversibility in Nickel Base Superalloys: Jean-Charles Stinville; P. G. Callahan; M. P. Echlin; V. Vallee; T. M. Pollock. 1University of California, Santa Barbara; 2Université de Poitiers - ENSMA

10:30 AM
Temperature and Microstructural Deformation of Dwell Fatigue in Near-Alpha Titanium Alloys: Michelle Han; Samantha Daly; Adam Pilchak. 1University of Michigan; 2University of California, Santa Barbara; 3U.S. Air Force Research Laboratory

10:50 AM
Examining Sub-Grain-level Plasticity and Fatigue Crack Growth Using High Energy X-ray Diffraction Microscopy and Crystal Plasticity Finite Element Modeling: William Musinski; Paul Shade; Mark Obstaclek; Todd Turner; David Menasche; Joel Bernier; Sirna Safriet; Darren Pagan; Peter Kenesel; Jun-Sang Park; Jon Almer. 1U.S. Air Force Research Laboratory; 2Hamiltonian Group; 3Lawrence Livermore National Laboratory; 4University of Dayton Research Institute; 5Cornell High Energy Synchrotron Source; 6Argonne National Laboratory

11:10 AM
The Influence of Alloying and Grain Size on Cyclic Twinning, Cyclic Stress-strain Response and Low Cycle Fatigue Behavior in Magnesium: Aerial Murphy-Leonard; Darren Pagan; John Allison. 1University of Michigan/Naval Research Laboratory; 2Cornell High Energy Synchrotron Source; 3University of Michigan

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Fracture of Functional and Structural Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Wednesday AM | March 13, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Daniel Kiener, Montanuniversität Leoben; Benoit Merle, University Erlangen-Nürnberg

8:30 AM Invited
Understanding Interface Failure and Fracture in Silicon Carbide Composites: David Armstrong. 1University of Oxford

8:50 AM
Reliable Lead-free Solders for Harsh Environments: Microstructure and Fracture Behaviour: Chaowei Du; Rafael Soler; Bernhard Voelker; Kurt Matoy; Johannes Zechner; Gregor Langer; Christoph Kirchlechner; Gerhard Dehm. 1Max-Planck Institut für Eisenforschung; 2Institute of materials chemistry, RWTH-Aachen; 3Infineon Technologies Austria AG; 4Kompetenzzentrum Automobil- und Industrieelektronik GmbH

9:10 AM
Experimental Characterization of Commercial Thermal Barrier Coating Systems: Jalil Aldoost. 1University of Poitiers; 2University of Oxford; 3University of Michigan; 4Department Materials Physics, Montanuniversität Leoben; 5Institut für Eisenforschung; 6Aeriel Murphy-Leonard; 7Infineon Technologies Austria AG; 8Institute of Industrial Microscopy, RWTH-Aachen; 9Argonne National Laboratory

9:30 AM
Multi-scale Study of the Deformation Mechanisms of p-type Half-Heusler Hf0.44Zr0.44Ti0.12CoSb0.8Sb0.2 Nanostructured Thermoelectric Alloy: Matthieu Aumand; Ken White; Ludovic Thilly. 1University of Poitiers; 2University of Houston

9:50 AM Break

10:10 AM Invited
Nanoindentation of Silicate Glasses at Loads Near the Cracking Threshold: George Pharr; Yvonne Dieudonne; Benjamin Hackett; Brittnie Mound. 1Texas A&M University; 2University of Tennessee

10:30 AM
In Situ TEM Fracture Experiments at RT: Inas Issa; Daniel Kiener. 1Department Materials Physics, Montanuniversität Leoben

10:50 AM
Interactions between Surface Topography, Multilayers, Nanostructure, Friction and Defects with Respect to Fracture Behavior and Safe Design of Diamond-like Carbon Thin Films: Anssi Laukkanen; Tom Andersson; Matti Lindroos; Kenneth Holmberg. 1VTT Technical Research Center of Finland

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11:10 AM  Relationships between Deformation Fields and Fracture in Heterogeneous Network Thin Films: Yoon Joo Na; Christopher Muhlstein; Georgia Institute of Technology

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Dissimilar Materials

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday AM | March 13, 2019
210B | Henry B. Gonzalez Convention Center

Session Chairs: Yuri Hovanski, Brigham Young University; Guntram Wagner, University of Chemnitz

8:30 AM  Comparison of Dissimilar Aluminum Alloys Joined by Friction Stir Welding with Conventional and Bobbin Tools: Paul Goetze; Mateusz Kopyscianiski; Carter Hamilton; Stanislav Dymek; Miami University; 4AGH University of Science and Technology

8:50 AM  Friction Stir Welding of Aluminum to ECO AZ31 Magnesium Alloy with Penetration of the Tool into the Bottom Layer: Reza Beygi; Kiarash Torabi; Ghadem Esisaabadi; Majid Zarazadeh Mehrizi; Shae Kwang Kim; Arak University; Korea Institute of Industrial Technology

9:10 AM  Microstructural and Mechanical Properties of Friction Stir Welding of Dissimilar Lap Joint of Metallurgically Immiscible CuCrZr and SS 316L: Pankaj Sahlot; Saurabh Nene; Michael Frank; Rajiv Mishra; Amit Arora; PDPU Gandhinagar and IIT Gandhinagar; University of North Texas; IIT Gandhinagar

9:30 AM  Invited
Promising High Speed Welding Techniques for Joining Polymers to Metals and Underlying Joining Mechanisms: Fengchao Liu; Pingsha Dong; University of Michigan

9:50 AM  Break

10:10 AM  Effect of Tool Eccentricity on Dissimilar Friction Stir Welding of 5052-6061 Aluminum Alloys: Luqman Hahim Ahmad Shah; Seyyedhossein Sonbolestan; Scott Walbridge; Adrian Gerlich; University of Waterloo

10:30 AM  Joining of Magnesium to Reinforced Polymers using Friction Stir Interlocking: Piyush Upadhyay; Md. Reza Rabby; Scott Whalen; Pacific Northwest National Laboratory

10:50 AM  Ultrasonic Enhanced Friction Stir Welding (USE-FSW) of Hybrid Aluminum/Steel-joints: Marco Thomä; Guntram Wagner; Benjamin Straß; Bernd Wolter; Sigrid Benfer; Wolfram Fürbeth; Chemnitz University of Technology; Fraunhofer Institute for Nondestructive Testing IZFP Saarbrücken; DEHEMA Forschungsinstitut

11:10 AM  Effect of Stress Concentration on Strength and Fracture Behavior of Dissimilar Material Joints: Tianhao Wang; Rajiv Mishra; University of North Texas

11:30 AM  Microstructure and Mechanical Properties of Dissimilar Ti/ Mg Joint Fabricated by Friction Stir Welding: Jeong-Won Choi; Huihong Liu; Kohsaku Ushioda; Hitoshi Fujii; Osaka University

MATERIALS PROCESSING

Friction Stir Welding and Processing X — High Melting Temperature Materials

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday AM | March 13, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Tracy Nelson, Brigham Young University; Hidetoshi Fujii, Osaka University

8:30 AM  Invited
Friction Stir Welding of Fibre-reinforced Titanium Composites for Aerospace Structures: Jonathan Martin; Craig Blacker; Kathryn Beamish; Advenit Makaya; Twi, Ltd.; TISICs, Ltd.; European Space Agency

8:50 AM  Invited
Microstructure and Mechanical Properties of the Friction Stir Welded Ultra-fine Grained CP Titanium: Jae-Deuk Kim; Chang Keun Chun; Jaekeun Hong; Yutaka Sato; Yeongdo Park; Dong-Eui University; Research Institute of Industrial Science & Technology; Korea Institute of Materials Science; Tohoku University

9:10 AM  Friction Stir Welding of Medium Mn Steel: Seung-Joon Lee; Yufeng Sun; Hidetoshi Fujii; Jeongho Han; Osaka University; Chungnam National University

9:30 AM  Invited
Friction Stir Welding of Steel with Laser Melting: Yoshiaki Morisada; Takuya Wada; Hidetoshi Fujii; Osaka University

9:50 AM  Break

10:10 AM  Invited
An Investigation into the Effects of Stir Zone Chemistry on Fracture Toughness in Friction Stir Welded Pipeline Grade Steel: Michael Efl; Jerry Gould; Jianqing Su; EWI/Ohio State University

10:30 AM  Invited
Plastic Flow Behavior and Mechanical Properties in Double-sided Friction Stir Weld of Advanced High Strength Steel Sheets: Muneo Matsushita; Daiki Yamagishi; Hiroshi Matsuda; Yoshiaki Murakami; JFE Steel Corporation

10:50 AM  Invited
Effects of Grain Refinement on Tensile Properties for Friction Stir Welds of CoCrFeMnNi High Entropy Alloys: Sangwon Park; Namhyun Kang; Youngsang Na; Hyoungseop Kim; Pusan National University; Korea Institute of Materials Science; Pohang University of Science and Technology

11:10 AM  Wear Mechanism for H13 Steel Tool during Friction Stir Welding of CuCrZr Alloy: Pankaj Sahlot; Rajiv Mishra; Amit Arora; PDPU Gandhinagar and IIT Gandhinagar; University of North Texas; IIT Gandhinagar
ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Biomass in Armor Composites

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayes, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Wednesday AM | March 13, 2019
008A | Henry B. Gonzalez Convention Center
Session Chairs: Carlos Vieira, State University of North Fluminense; Elaine Carvalho, State University of the Northern Rio de Janeiro

8:30 AM Introductory Comments
8:35 AM Keynote
Izod Impact Test on Epoxy Composites Reinforced with Mallow Fibers: Lucio Cassiano Nascimento; Sérgio Monteiro; Ulisses Costa; Luana Demosthenes; ‘Military Institute of Engineering

8:55 AM
Evaluation on the Design of Piassava Fiber Reinforcement Epoxy Matrix Composite for Ballistic Application: Fabio Garcia Filho; Sergio Monteiro; Michelle Oliveira; Luana Demosthenes; ‘Military Institute of Engineering

9:15 AM
Ballistic Test of Multilayered Armor with Intermediate Polyester Composite Reinforced with Fique Fabric: Artur Pereira; Foluke de Assis; Luana Cristyne da Cruz Demosthenes; Fabio da Costa Garcia Filho; Sergio Neves Monteiro; ‘Military Institute of Engineering

9:35 AM
Ballistic Tests of Epoxy Matrix Composites Reinforced with Arapaima Fish Scales: Luis Carlos Silva; Michelle Oliveira; Luana Demosthenes; Wendell Bezerra; Sergio Monteiro; ‘Military Institute of Engineering

9:55 AM Break

10:05 AM
Evaluation of Buriti Fabric as Reinforcement of Polymeric Matrix Composite for Ballistic Application as Multilayered Armor System: Luana Demosthenes; Sergio Monteiro; Lucio Nascimento; Fabio Filho; Michelle Oliveira; Leandro Demosthenes; Artur Pereira; Fernanda Luz; Edio Lima JR; ‘Military Institute Engineering; UFAM

10:25 AM
Evaluation of the Absorbed Energy and Velocity Limits of Reinforced Epoxy Composites with Mallow Natural Fibers Used in Ballistic Protection: Lucio Nascimento; Sérgio Monteiro; Jheison dos Santos; Luana Demosthenes; Ulisses Oliveira; ‘Military Institute of Engineering

10:45 AM
Fique Fiber-reinforced Epoxy Composite for Ballistic Armor Against 7.62 mm Ammunition: Michelle Oliveira; Artur Camposo; Fernanda Luz; Fábio Braga; Lucio Nascimento; Edio Lima Jr.; Sergio Monteiro; Fabio Garcia; Luana Demosthenes; ‘Military Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Structural Design, Processing and Properties

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Wednesday AM | March 13, 2019
209 | Henry B. Gonzalez Convention Center
Session Chairs: Mingxin Huang, University of Hong Kong; Soo-Hyun Joo, Tohoku University; Xiuyan Li, Institute of Metal Research

8:30 AM Invited
Alloy Design by Dislocation Engineering: MingXin Huang; University of Hong Kong

8:55 AM
Deformation Microstructure and Mechanism of Ni during Refined into Extremely Fine Nano-grains: Zhaoping Luo; Xiaokai Guo; Xin Zhou; Jianxin Hou; Xiuyan Li; Ke Lu; ‘Institute of Metal Research, Chinese Academy of Sciences

9:15 AM
Formation of Low Angle Boundary-dominated Nanolaminated Structures in Pure Al: Xiaochun Liu; Wei Xu; Ke Lu; ‘Institute of Metal Research

9:35 AM Invited
Evolution of Heterogeneous Structure and Phase Transformation Behavior during Liquid Metal Deallyoing: Soohyun Joo; Hidemi Kato; Takeshi Wada; Tohoku University

10:00 AM
The Effects of Microstructural Heterogeneity and Porosity Distribution on the Evolution of Plastic Anisotropy and Failure under Uniaxial Tension of Additively Manufactured AlSi10Mg Alloy by Selective Laser Melting: Waqas Muhammad; Abhijit Brahme; Raja Mishra; Kaan Inal; University of Waterloo; ‘General Motors Research & Development Center

10:20 AM Break

10:40 AM Invited
Severe Deformation of a Lamellar Microstructure: Pearlite Steel as a Case Study: Steffen Brinckmann; Gerhard Dehm; Max-Planck-Institute

11:05 AM
Small-volume Aluminum Alloys with Native Oxide Shell Deliver Unprecedented Strength and Toughness: Weizhong Han; Xi’an Jiaotong University
11:25 AM  
Structural Design of Synthetic Honeycombs with the Introduction of Heterogeneously Distributed 5-7 Defects and Arrays: Bosco Yu; David Wilkinson; Hatem Zurob; & Mcmaster University

ADVANCED MATERIALS

High Entropy Alloys VII — Thermal and Other Properties I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Wednesday AM | March 13, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Veerle Keppens, University of Tennessee; Joseph Poon, University of Virginia

8:30 AM  Invited  
High-entropy Oxides: A Path to Novel Materials with Enhanced Functionality: Veerle Keppens; University of Tennessee

8:50 AM  Invited  
Radiation Effects in Concentrated Solid Solution Alloys: Yanwen Zhang; Gihan Velisa; Shijun Zhao; Ke Jin; Ritesh Sachani; Yury Osetskyi; Chenyang Liu; Lumin Wang; William Weber; Oak Ridge National Laboratory; University of Michigan; University of Tennesse

9:10 AM  Invited  
High Entropy Alloy Phases Mined From Phase Diagrams: Joseph Poon; Qi Jie; University of Virginia

9:30 AM  Invited  
Self-diffusion in High-entropy Alloys: Gerhard Wilde; University of Muenster

9:50 AM  Invited  
Surface Degradation of High Entropy Alloys — Corrosion, Erosion, and Wear Behavior and Mechanisms: Aditya Ayyagari; Jibril Shittu; Sundeep Mukherjee; University of North Texas; University of North Texas

10:10 AM  Break

10:30 AM  Invited  
In Situ Ion Irradiation on Al-Co-Cr-Fe-Ni High Entropy Alloys: Jing Hu; Argonne National Laboratory

10:50 AM  Invited  
Correlating He Bubble Segregation in APT Data to Radiation Tolerance for Single-phase Concentrated Solid-solution Alloys (SP-CSAs): Jonathan Polonowsky; Xing Wang; Wei Guo; Ke Jin; Hongbin Bi; Yongqiang Wang; William Weber; Yanwen Zhang; Karen Morel; Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; Materials Science Research and Development, Timken World Headquarters; Materials Science and Technology Division, Oak Ridge National Laboratory; Materials Science and Technology Division, Los Alamos National Laboratory

11:30 AM  Invited  
Deformation of Single-phase Small-scale HEAs at Cryogenic Temperatures: Julia Green; Adenike Giwa; Zachary Altkner; Yong-Wei Zhang; Peter Liaw; California Institute of Technology; Institute for High Performance Computing

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment — CALPHAD and Ab-initio Studies of Phase Equilibria

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Wednesday AM | March 13, 2019
304B | Henry B. Gonzalez Convention Center

Session Chair: Raymundo Arroyave, Texas A&M University

8:30 AM  Invited  
CALPHAD Modeling, Moving Forward: Ursula Kattner; National Institute of Standards and Technology

9:00 AM  Invited  
OpenCalphad - Thermodynamics for Phase Diagrams and Simulations: Bo Sundman; Christophe Sigli; Catalina Heresi; Instn; Constellium CRV; Ruhr University Bochum

9:30 AM  Invited  
Beyond Modeling of Phase-based Properties: Zi-Kui Liu; Pennsylvania State University

10:00 AM  Break

10:20 AM  Invited  
Modelling Structural Materials in Realistic Environments by Ab Initio Thermodynamics: Joerg Neugebauer; Mira Todorova; Blazej Grabowski; Tilmann Hickel; MPI fuer Eisenforschung

10:50 AM  Invited  
Stability of Cu6Sn5, a First-principles Study: Gautam Ghosh; Northwestern University

11:20 AM  
Phase Stability and Magnetic Properties of Fe-Cr-Ni-Mn High Entropy Alloys from First-principles and Monte-Carlo Simulations: Mark Fedorov; Jan S. Wrobel; Antonio Fernandez-Caballero; K.J. Kurzydlowski; Duc Nguyen-Manh; Warsaw University of Technology; University of Manchester; United Kingdom Atomic Energy Authority
MATERIALS DESIGN
ICME Case Studies and Validation: Extreme Environments — Session III

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwon Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Wednesday AM | March 13, 2019

**207A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Mark Carroll, Federal-Mogul Powertrain; Laurent Capolungo. Los Alamos National Laboratory

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**8:30 AM Invited**

Thermodynamic Properties in Ni Based Alloys Using a First Principles Renormalized Potential: Ryoji Sahara1; Toshio Osada1; Swastibrata Bhattacharyya2; Kaoru Ohno1; 1National Institute for Materials Science

**9:00 AM**

An ICME Method for Predicting Phase Transformation and Microstructural Evolution in Advanced High Pressure Die Casting Magnesium Alloys: Zhenjie Yao1; Tracy Berman1; John Allison1; 1University of Michigan

**9:20 AM**

Bonding Mechanisms for Single Particle Impact during Cold Spray of Aluminum Powders: Sumit Suresh1; Jie Chen1; Seok-Woo Lee1; Mark Aindow1; Harold Brody2; Victor Champagne2; Avinash Dongare3; 1University Of Connecticut; 2U.S. Army Research Laboratory

**9:40 AM**

Data Mining Methods for Characterization of Creep of Ti-X Alloys: A First-principles Study: Ying Zhang1; Jinshan Li1; William Yi Wang1; Chengxiong Zou1; Bin Tang1; Jun Wang1; Hongchao Kou1; 1Northwestern Polytechnical University

**10:00 AM** Break

**10:20 AM**

Integrated Modelling of Microstructure Evolution for Yield Strength Prediction in Aluminum Alloys: Qianying Shi1; Tracy Berman1; Jacob Garves2; Chal Park1; John Allison1; 1University of Michigan

**10:40 AM**

Modeling of Sheet Metal Forming Based on Implicit Embedding of the Elasto-plastic Self-consistent Formulation in Finite Elements: Application to Cup Drawing of Al6022-T4: Timothy Barrett1; Milovan Zecevic1; Marko Knezevic1; 1University of New Hampshire

**11:00 AM**

Revealing the Solute Effects and Strengthening Mechanisms of Ti-X Alloys through High-throughput First-principles Calculations: Chengxiong Zou1; Jinshan Li1; William Yi Wang1; Ying Zhang1; Bin Tang1; Jun Wang1; Hongchao Kou1; 1School of Materials Science and Engineering, Northwestern Polytechnical University

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**11:20 AM**

Texture Evolution and Hardening Behavior during Thermomechanical Processing of an Al-Li Alloy: Tracy Berman1; Arunabha Roy2; Chal Park1; Veera Sundararaghavan1; John Allison1; 1University of Michigan

**11:40 AM**

Enhanced Hardening due to FCC-HCP Transformation in Medium-entropy CrCoNi Alloy: Supriyo Chakraborty1; Connor Stone2; Jiashi Miao2; Easo George2; Michael Mills2; 1Ohio state University; 2Ohio State University; 3University of Tennessee

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**CHARACTERIZATION**

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Folles — Mechanical Behavior I: A Joint Session with Mechanical Behavior Related to Interfacial Physics III

**Sponsored by:** The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Wednesday AM | March 13, 2019

**302C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Saryu Fensin. Los Alamos National Laboratory; Eric Homer, Brigham Young University

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**8:30 AM Invited**

Atomic Level Investigation of the Structure and Mechanical Behavior of a/b Interfaces and Twin Boundaries in Titanium Alloys: Michael Baskes1; Doyl Dickel1; 1Mississippi State University

**9:00 AM**

An Atomistic Study of the Deformation Behavior of Bulk Titanium Alloys: Tonya Stone1; Parshu Bhusal1; Doyl Dickel1; Mark Horstemeyer1; 1Mississippi State University

**9:20 AM**

Grain Boundary Segregation Strengthening in Nanocrystalline Aluminum Alloys: Wenbo Wang1; Jason Trelewicz1; 1Stony Brook University

**9:40 AM**

Mechanical Response of Nano Scale Bicontinuous Copper Molybdenum with Varying Feature Sizes: Nathan Beets1; Yuchi Cui2; Diana Farkas1; Amit Misra3; 1Virginia Polytechnic Institute and State University; 2University of Michigan

**10:00 AM**

Understanding the Mechanical Behavior of Nanotwinned Ni-Mo W Films for High Temperature MEMS Applications: Gianna Valentino; Praalav Shetty; Jessica Kroghstad; Timothy Wehrs1; Kevin Hemker; 1Johns Hopkins University; 2University of Illinois at Urbana-Champaign

**10:20 AM** Break

**10:40 AM Invited**

Role of Grain Boundaries in Polycrystall Plasticity: Richard LeSar1; John Graham1; Laurent Capolungo1; 1Iowa State University; 2Los Alamos National Laboratory
11:10 AM Invited
Unraveling the Mechanistic Origins of Deformation and Strain Accommodation in Nanocrystalline Materials: Garritt Tucker; Ankit Gupta; Satish Rajaram; Gregory Thompson; Colorado School of Mines; Drexel University; University of Alabama

11:40 AM
Connecting Grain Boundary Properties to the Response of Tantalum under Shock Compression and Release: Eric Hohn; Saryu Fensin; Tim Germann; Los Alamos National Laboratory

12:00 PM Invited
Void Formation at Boundaries under Incipient Spall Conditions: Anthony Rollett; Evan Lieberman; David Menasche; Ricardo Lebensohn; Robert Suter; Carnegie Mellon University; Los Alamos National Laboratory; Hamiltonian Group

LIGHT METALS
Magnesium Technology 2019 — Corrosion and Surface Protection

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Wednesday AM | March 13, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: J. Brian Jordon, University of Alabama; Chaitanya Kale, Arizona State University

8:30 AM Invited
Effect of Alloying with Rare-earth Metals on the Degradation of Magnesium Alloys Studied Using a Combination of Isothermal Calorimetry and Pressure Measurements: Lars Wadsö; Norbert Hort; Dmytro Orlov; Lund University; Helmholtz-Zentrum Geesthacht

8:50 AM
Galvanically Graded Interface: A Computational Model for Mitigating Galvanic Corrosion between Magnesium and Mild Steel: Kurt Spies; Vineet Joshi; Vilayanur Viswanathan; Ayoub Soulati; Yuri Hovanski; Pacific Northwest National Laboratory

9:10 AM
Iron Content in Relationship with Alloying Elements and Corrosion Behaviour of Mg3Al Alloys: Ha Nguyen; Jongil Kim; Young Min Kim; Bong Sun You; Korea University of Science and Technology; Chungnam National University; Korea Institute of Materials Science

9:30 AM
Microstructure, Corrosion and Mechanical Properties of Mg-Si Alloys as Biodegradable Implant Material: Weidong Wang; Ke Yang; Yuanding Huang; Norbert Hort; Helmholtz-Zentrum Geesthacht; Institute of Metal Research

9:50 AM
The Influence of Temperature and Medium on Corrosion Response of ZE41 and E233: Marwa AbdelGawad; Ali Chaudhry; Bilal Mansoor; Texas A&M University at Qatar

10:10 AM Break

10:30 AM Invited
Alloy Design Strategy of the Native Anti-corrosion Magnesium Alloy: Yuan Yuan; Fusheng Pan; Bin Jiang; Jiajia Wu; Tao Chen; Chongqing University
MATERIALS PROCESSING

Materials Processing Fundamentals — Extractive Process and Thermodynamic Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelsis

Wednesday AM | March 13, 2019
212A | Henry B. Gonzalez Convention Center

Session Chairs: Fiseha Tesfaye, Abo Akademi University; Jake McMurray, Oak Ridge National Laboratory

8:30 AM Introductory Comments

8:35 AM
An Investigation on Electrodeposition of Titanium in Molten LiCl-KCl: Chenyao Li1; Jianxun Song1; Shaolong Li1; Xuepeng Li1; Yongchun Shu1; Jilin He2; Zhengzhou University

8:55 AM
A Scalable Gibbs Minimization Model for Solvent Extraction Applied to Rare Earths Separation: Chukwunwike Iloeje1; Diane Graziano1; Joe Cresko1; Argonne National Lab; US Department of Energy

9:15 AM
Effect of Ultrasound on the Extraction of Silicon and Aluminum from Metallurgical Slag of Laterite Nickel Ore: Pengju Zhang1; Jilai Xue1; Xuan Liu1; Donggen Fang1; School of Metallurgical and Ecological Engineering

9:35 AM
Thermal Stability and Thermodynamics of the Ag2ZnGeS4 Compound: Mykola Moroz1; Fiseha Tesfaye2; Pavlo Demchenko2; Myroslava Prokhorenko2; Daniel Lindberg2; Oleksandr Reshetnyak2; Leena Hupa3; Abo Akademi University; Ivan Franko National University of Lviv; Lviv Polytechnic National University; Aalto University

9:55 AM Break

10:15 AM
Thermochemical Data of Selected Phases in the FeOx-Fe2O4-Fe2(SO4)3 System: Fiseha Tesfaye1; In-Ho Jung2; Min-Kyu Paek2; Mykola Moroz1; Daniel Lindberg2; Leena Hupa3; Abo Akademi University; Seoul National University; Aalto University

10:35 AM
The Effect of Heat Treatment to FePt/Fe3O4 and FePt/Cu Magnetic Performance: Naidu Seetal1; Deidre Henderson1; Jumel Jno-Baptiste1; Hao Wen2; Shengmin Guo3; Grambling State University; Louisiana State University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Creep, Fatigue, and Fracture

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Wednesday AM | March 13, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Janelle Wharry, Purdue University

8:30 AM Invited
Irradiation Induced Creep in FCC Alloys Measured Using In Situ TEM: Shen Dillon1; Gowtham Jawaharam2; Christopher Barr2; Khalid Hattar1; University of Illinois; Sandia National Laboratories

9:00 AM
Characterization of Creep-fatigue Crack Propagation in Alloy 709 at High Temperatures Using Computational Simulations and Experimental Testing: Jose J. Ramirez1; Gabriel Potimiche1; Robert Stephens1; Indrajit Charit2; Nicholas Shaber2; Martin Taylor2; University of Idaho

9:20 AM
Compressive Creep of Porous γ-phase Uranium Metal: Karyn Stern1; Luis Ortega1; Sean McDeavitt2; Department of Nuclear Engineering, Texas A&M University

9:40 AM
On the Remarkable Fracture Toughness of 90 to 97W-NiFe Alloys Revealing Powerful New Ductile Phase Toughening Mechanisms: Md Ershadul Alam1; G R Odette3; University of California Santa Barbara

10:00 AM Break

10:20 AM
Creep-fatigue Interaction of Fe-25Ni-20Cr Austenitic Stainless Steel (Alloy 709): Abdullah Alomari1; Nilesh Kumar2; Korukonda Murty1; North Carolina State University

10:40 AM
Experiments and Modeling of Mechanical Behaviour of Zircaloy-4 under Monotonic and Cyclic Loading for Research on Stress Corrosion Cracking: Yuqing Ding1; Gregory Kasprick1; Sterling St Lawrence2; Canadian Nuclear Laboratories

11:00 AM
In Situ TEM Clamped Beam Fracture of Irradiated Fe-9Cr ODS: Kayta Yano1; Janelle Wharry3; Purdue University

11:20 AM
Understand the Phase Transformation and Mechanical Behavior of Thermally Aged and Neutron Irradiated Duplex Stainless Steels Using High-energy X-ray Beamline Experiments: Yu Lu1; Shilei Li1; Yiren Chen1; Yong Yang1; University of Florida; Argonne National Laboratory
TECHNICAL PROGRAM

Wednesday AM | March 13, 2019

**303B | Henry B. Gonzalez Convention Center**

**Session IV**

**Modeling and Simulation of Composite Materials — Session IV**

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

**Wednesday AM | March 13, 2019**

**303B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Peng. Zhao, Panzhihua University; Masanori Enoki, Tohoku University; Rakesh Behera, New York University

8:30 AM

Accounting for Slip Localization at the Grain Scale in Polycrystal Homogenization Applied to FCC Metals and Alloys: Maxime Sauzay\(^1\); Diogo Goncalves\(^1\); Bertrand Sicaud\(^1\); Jérôme Hazan\(^1\); \(^1\)Cea Université Paris-Saclay; \(^2\)Cea Cadarache

8:50 AM

Monte Carlo Simulation for Clustering Behavior between Interstitial and Substitutional Elements in Iron: Masanori Enoki\(^1\); Hiroshi Ohtani\(^1\); \(^1\)Tohoku University

9:00 AM

Break

9:10 AM

Properties of xKF-yNaF-zAlF\(_3\): Jie Li\(^1\); Steven Suib\(^1\); \(^1\)Sanford Research

9:30 AM

Manganese Oxide: Effect of Process Conditions on the Hierarchical Structure of UCT Nanoporous Cu with Nanovoids: Cuncui Fan\(^1\); Jin Li\(^1\); Youxing Chen\(^1\); Xinghang Zhang\(^1\); \(^1\)Purdue University; \(^2\)University of Minnesota

9:50 AM

Break

10:20 AM

Microfabricated Nanoporous Gold Morphology Libraries for the Study of Structure-property Relationships: Erkin Seker\(^1\); \(^1\)University of California, Davis

10:50 AM


**NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

**Wednesday AM | March 13, 2019**

**214A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Antonia Antoniou, Georgia Institute of Technology; Erkin Seker, University of California, Davis

8:30 AM Invited Applications of Nanoporous Metals to Semiconductor Device Interconnects: Antonia Antoniou\(^1\); Vanessa Smet\(^1\); \(^1\)Georgia Institute of Technology

9:00 AM Invited

On the Structure-activity Correlation of Catalytic Nanoporous Gold: Yi Ding\(^1\); \(^1\)Tianjin University of Technology

9:30 AM

Graphene-carbon Nanotube Aerogel As ‘Organic’ Thermoelectrochemical Energy Harvesters: Synthesis, Structure and Properties: Sanju Gupta\(^1\); R. Meek\(^1\); \(^1\)Western Kentucky University

9:50 AM Break

10:20 AM Invited

Microfabricated Nanoporous Gold Morphology Libraries for the Study of Structure-property Relationships: Erkin Seker\(^1\); \(^1\)University of California, Davis

10:50 AM


11:10 AM

In Situ TEM Study on the Radiation Response of Nanostructured Cu with Nanovoids: Cuncui Fan\(^1\); Jin Li\(^1\); Youxing Chen\(^1\); Xinghang Zhang\(^1\); \(^1\)Purdue University; \(^2\)University of Minnesota

11:30 AM

Graphene-based ‘Hybrid’ Aerogels with Carbon Nanotubes: Mesoporous Network Functionality Promoted Defect Density and Electrochemical Activity Correlations: Sanju Gupta\(^1\); \(^1\)University of California, Davis; \(^2\)Western Kentucky University
PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys II

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Sophie Primig, University of New South Wales; Rajarshi Banerjee, University of North Texas

Wednesday AM | March 13, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Tushar Borkar, Cleveland State University; Timothy Weihs, Johns Hopkins University

8:30 AM
Experimental and Theoretical Examinations of Dynamic Precipitation in a Mg-9Al (wt.%) Alloy during Low-temperature Equal Channel Angular Extrusion (ECAE): Xiaolong Ma1; Suhas Eswarappa Premeela2; Peng Yi3; Matthew Fernandez1; Nicholas Krywopusk1; Laszlo Kecskes5; Tomoko Sano5; Michael Fink5; Timothy Weihs5; 1Johns Hopkins University; 2MatSys; 3U.S. Army Research Laboratory

9:10 AM
Mechanisms of Phase Stabilization in AlCuMnZr (ACMZ) Alloys: Amit Shyam1; Dongwon Shin1; Patrick Shower2; Lawrence Allard2; Jonathan Poplawsky3; Yukinori Yamamoto1; James Morris1; James Haynes1; 1Oak Ridge National Laboratory

9:30 AM
Mechanistic Insights on the Enhanced Environmental Stability of Sputtered Deposited Nanograined Alloys: Pralav Shetty1; Megan Emigh1; Jessica Krogstad1; 1University of Illinois at Urbana-Champaign

9:50 AM
Transformation Pathways and Microstructural Evolution in Shock-loaded Zr and Ti: Benjamin Morrow1; David Jones2; Cayla Harvey3; Ellen Cerreta1; 1Los Alamos National Laboratory; 2University of Nevada, Reno

10:10 AM Break

10:30 AM
Understanding the Role of Microstructure on High Pressure Phase Transformation in Zirconium: M Arul Kumar1; N Hilaire2; Yanbin Wang3; Rodney McCabe2; Irene Beyerlein2; Laurent Capolungo4; Carlos Tome1; 1Los Alamos National Laboratory; 2CNRS-UMET, Université Lille; 3Argonne National Laboratory; 4University of California Santa Barbara

10:50 AM
A Unified Theory for Deformation-induced Transformations (TRIP/TWIP) in Titanium and Ferrous Alloys: Madeleine Bignot1; Pedro Rivera-Diaz-Dei-Castillo2; Emmanuel Bertrand3; Franck Tancret1; 1Université de Nantes; 2University of Lancaster

11:00 AM
Atom Probe Tomography and Scanning Transmission Electron Microscopy Correlative Characterization of In Situ Evolution of Precipitation Structure upon Ageing in an Al-Zn-Mg-Cu Alloy: Williams Lefebvre1; Normandie University, UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, F-

11:30 AM
Discontinuous Precipitation in U10Mo Alloy: Reaction Kinetics, Effect of Prior γ-U1Mo Microstructure, and the Effect of Ternary Alloying Addition: Saumyadeep Jana1; Arun Devraj1; Lucas Sweet1; Curt Lavender1; Vineet Joshi1; 1Pacific Northwest National Laboratory

NANOSTRUCTURED AND HETEROEUTECTIC MATERIALS

Powder Processing of Bulk Nanostructured Materials — Powder Synthesis

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Wednesday AM | March 13, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Ma Qian, RMIT University

8:30 AM
The Role of Dehydrogenation in Powder Sintering Involving TiH2: Gang Chen1; Peng Cao2; Klaus-Dieter Liss1; Graeme Auchterlonie2; Xuanhui Qu1; 1University of Science and Technology, Beijing; 2The University of Auckland; 3Israel Institute of Technology; 4University of Queensland

9:00 AM
Inhomogeneous Mechanical Alloying during Ball Milling of Fe alloys: How Grain Boundary Segregation Prevails over Extreme Deformation: Dor Amram2; Christopher Schuh1; 1Massachusetts Institute of Technology

9:20 AM
Inhomogeneity of Strain in Metal Particulates Produced by Modulation-assisted Machining: Indrani Biswas2; James Mann3; Srinivasan Chandrasekar4; Kevin Trumble1; 1Purdue University; 2University of West Florida

9:40 AM
As-Atomized Spherical GARS Powder for Direct Shape Forming of Fe-based ODS Alloys by Cold Spray Deposition: Iver Anderson1; Emma White1; Timothy Prost2; Timothy Eden2; Todd Palmer2; 1Iowa State University; 2Pennsylvania State University

10:00 AM Break

10:20 AM
Density Separation of Mixed Carbide Colloids via Standing Wave Physics: Trenin Boyless1; Grant Wallace1; Jerome Downey1; 1Montana Tech

10:40 AM
Fabrication, Characterization, and Optimization of Cold-crucible based Rapidly Solidified Ti Powders: Sardar Farhat Abbas1; Bin Lee2; Daekyoom Kim3; Young Il Kim2; Sanghyun Lee2; Taek-Soo Kim3; 1University of Science and Technology; 2Korea Institute of Industrial Tech
11:00 AM
Synthesis of TiHx Powders from Titanium Alloy Shavings by Thermohydrogen Processing
Zhongqi Liu; Junhao Li; Qinfeng Ruan; Ruigang Wang; University of Alabama

ELECTRONIC MATERIALS
Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — 2D/3D Printed Electronics Advances

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Wednesday AM | March 13, 2019
217A | Henry B. Gonzalez Convention Center
Session Chairs: Pooran Joshi, Oak Ridge National Laboratory; Nuggehalli Ravindra, New Jersey Institute of Technology

8:30 AM Invited
Conformal and Embedded Electronics in 3D: Mike Renn; Optomec

9:00 AM Invited
Additive Manufacturing of High Performance Rare Earth Permanent Magnets: Prospects and Challenges: Mariappan Paranthaman; Oak Ridge National Laboratory

9:30 AM Invited
Additive Manufacturing of Functional Electronics and Ingestible Biomedical Devices: Yong Lin Kong; University of Utah

10:00 AM Break

10:20 AM Invited
Adaptive 3D-Printed Liquid Metal Electronics: Christopher Tabor; Air Force Research Laboratory

10:50 AM
3D Printing of Polymer-based Gasochronic, Thermochronic and Piezochronic Sensors: Patrick Dzisah; Nuggehalli Ravindra; New Jersey Institute of Technology

11:10 AM Invited
3D Printed High Performance Sensors: Rahul Panat; Md Taibur Rahman; Matthew Schrandt; Michael Renn; M. Sadeq Saleh; Chih-Yang Cheng; Chintalapalle Ramana; Carnegie Mellon University; Optomec Inc.; University of Texas, El Paso

11:40 AM
Electronic Tongue Sensing with a Six-sensor Array for Multi Flavors Detection: Yangchao Yu; Pooran Joshi; Jayne Wu; Anming Hu; University of Tennessee; Oak Ridge National Laboratory

BIOMATERIALS
Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Biomedical and Polymeric Applications

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Nancy Michael, University of Texas Arlington; Gerald Ferblantier, Icube Laboratory; Heinz Palkowski, Clausthal University of Technology; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Wednesday AM | March 13, 2019
217A | Henry B. Gonzalez Convention Center
Session Chairs: Adele Carrado, Strasbourg University; Nancy Michael, University of Texas Arlington

8:30 AM Keynote
Examining the Long-Term Adhesion Strength of Chitosan Bonded to Titanium when Exposed to Heated Simulated Body Fluid: Holly Martin; Lauren DeBow; Patrick McWhorter; Snjezana Balaz; Youngstown State University

9:10 AM Invited
Duplex Surface Treatments for Improving the Tribological Properties of Titanium Alloys: Brandon Strahn; Gary Doll; University of Akron

9:35 AM
Fractured Oxide Films on Metals as Reservoir for Biological Agents to Create Antibacterial Surfaces: Jesus Morales Espejo; Susana Diaz A; Lia Stanciu; David Bahri; Purdue University

9:55 AM
Characterization and Properties Study of Cu and Ag Inclusion in Zr-Ti Matrix for Biomedical Application: Akib Jabeed; Ishraq Shabib; Waseem Haider; Central Michigan University

10:15 AM Break

10:35 AM Invited
Structural, Magnetic, and Cytotoxicity Studies on CoFe2O4 Nanoparticles for Biomedical Applications: Yesappa Kolekar; Sumayya Ansari; Chintalapalle Ramana; Savitribai Phule Pune University, Pune; University of Texas, El Paso

11:00 AM
Polymer Brushes: Routes Toward Biomedical Implants: Melanie Reggenti; Sebastien Kriegel; Patrick Masson; Genevieve Pourroy; Jacques Fabrer; Heinz Palkowski; Adele Carrado; EPFL SB ISIC LNB; IPCMS - CNRS; Institute of Metallurgy TU Clausthal

11:20 AM
Assembly of Glass Particles and Copolymer Latex on the Surface of Silicone Oil and Halbrite Liquid: Kinnari Shah; Nuggehalli Ravindra; LaGuardia Community College; New Jersey Institute of Technology

11:40 AM
Force Field for Molybdenum Disulfide and Molybdenum Diselenide to Compute Bulk and Interfacial Properties with Electrolytes and Biomacromolecules in High Accuracy: Juan Liu; Jin Zeng; Zewei Wang; Jiajun Chen; Jim de Yoreo; Yu Huang; Hendrik Heinz; University of Colorado, Boulder; Pacific Northwest National Laboratory; University of California, Los Angeles
ENERGY & ENVIRONMENT

REWAS 2019: Education and Workforce Development

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Adam Powell, Worcester Polytechnic Institute; Christina Meskers, Umicore; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

**Wednesday AM | March 13, 2019**

007D | Henry B. Gonzalez Convention Center

**Session Chairs:** Adam Powell, Worcester Polytechnic Institute; Christina Meskers, Umicore

8:30 AM Introductory Comments

8:35 AM Invited
Sustainable Electronics: An Action-based Graduate Program: Carol Handwerker; ¹Purdue University

9:00 AM
The Contribution of Industry to STEM Education and Lifelong Learning: Tom Hennebel; Christina Meskers; Maurits Van Camp; ¹Umicore, Belgium

9:20 AM
Sustainability as a Lens for Traditional Material Science Curriculums: Gabrielle Gaustad; ¹Alfred University

9:40 AM Invited
Sustainability through Selection: Uday Pal; ¹Boston University

10:05 AM Break

10:25 AM Invited
How to Nurture Young Talents in the Materials Sector: Gijs Du Loing; ¹Ghent University

10:50 AM Invited
Corrosion Education for Materials Life Extension: Pathway to Improvement in Resource Productivity: Brajendra Mishra; ¹Worcester Polytechnic Institute

11:15 AM
Material Oriented Product Development by QFD4Mat Material Selection Strategy Approach: Fabrizio D’Errico; ¹Politecnico Di Milano Politecnico Di Milano

11:35 AM Invited
EIT RawMaterials Academy – Educating and Inspiring the Lifecycle of Innovators: Wesley Croch; Rima Dapous; ¹EIT RawMaterials GmbH

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ENERGY & ENVIRONMENT

REWAS 2019: Rethinking Production

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Gabrielle Gaustad, Alfred University; Elsa Olivetti, Massachusetts Institute of Technology

**Wednesday AM | March 13, 2019**

007C | Henry B. Gonzalez Convention Center

**Session Chairs:** John Howarter, Purdue University; Mingming Zhang, ArcelorMittal

8:30 AM Invited
Recycling Steel Manufacturing Wastewater Treatment Solid Wastes via In-process Separation with Dynamic Separators: Naiyang Ma; ¹Arcelor Mittal

8:55 AM Invited
Metal-rich Byproduct Processing: Flexible Smelting for Responsible Recycling: Joshua Montenegro; ¹Conecsus LLC.

9:20 AM
In Furnace Dross Pressing - IFDP: David Roth; Michael Rockstroh; ¹GPS Global Solutions; ²RIA Cast House Engineering GMBH

9:45 AM
TAHA Dross Processing: A Proven Technology for Processing Dross with Great Aluminum Recoveries and Zero Waste: Frank Pollmann; David Roth; ¹TAHA International; ²GPS Global Solutions

10:05 AM Break

10:25 AM
Tannic Acid – A Novel Intumescent Agent for Epoxy Systems: Matthew Korey; Alexander Johnson; William Webb; John Howarter; ¹Purdue University

10:45 AM
Sustainable Use of Precious and Rare Metals through Biotechnological Recycling: Norizo Saito; Toshiyuki Nomura; Yasuhiro Konishi; ¹Osaka Prefecture University

11:05 AM
Effect of CO Partial Pressure on Extraction of Alumina from Coal Fly Ash during Carbothermal Reduction Process: Yang Xue; Wenzhou Yu; Zhixiong You; Xuewei Lv; ¹Chongqing University

11:25 AM
Removal of Sulfur from Copper Smelting Slag by CO2: Yun Wang; Rong Zhu; Shaoyan Hu; Hongyang Wang; Yaguang Guo; ¹University of Science & Technology, Beijing; ²China ENFI Engineering Co., Ltd.
LIGHT METALS

Scandium Extraction and Use in Aluminum Alloys — Scandium Markets and Extraction

*Sponsored by:* TMS Light Metals Division, TMS: Aluminum Committee

*Program Organizers:* Nigel Ricketts, Altrius Engineering Services; John Grandfield, Grandfield Technology Pty Ltd

**Wednesday AM | March 13, 2019**
006D | Henry B. Gonzalez Convention Center

*Session Chair:* Nigel Ricketts, Altrius Engineering Services

8:30 AM Introductory Comments

8:35 AM Panel Discussion: Scandium supply, markets and applications

9:35 AM Aluminium-Scandium Alloy Production via the Metalysis Process: Ian Mellor; Lyndsey Benson; Melchiorre Conti; Luke Benson Marshall; Stephen Repper; Nader Khan; 1Metalysis Ltd.

10:00 AM Scandium Solvent Extraction: Nigel Ricketts; 1Altrius Engineering Services

10:25 AM Break

10:40 AM Improved Technology of Scandium Recovery from Solutions of Bauxite Residue Carbonation Leaching: Andrey Panov; Olga Petrakova; Aleksander Kozyrev; Aleksander Suss; Sergey Gorbachev; 2Rusal

11:05 AM Refining Technology of Scandium Concentrate Obtained from Bauxite Residue: Andrey Panov; Aleksander Suss; Aleksander Kozyrev; Sergey Gorbachev; Olga Petrakova; 1Rusal

11:30 AM Experimental Study of Pre-concentration from Silicate Containing Rare Earth Ore with Scandium by Magnetic Separation: Peng Yani; Guifang Zhang; Bo Li; Lei Gao; Zhe Shi; Hua Wang; Yindong Yang; 1Kunming University of Science and Technology; 2University of Toronto

SPECIAL TOPICS

Science Policy within the Materials Research Community — Science Policy for Materials Research

*Sponsored by:* TMS: Education Committee

*Program Organizers:* Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan; Max Powers, University of Michigan; Brian Tobelmann, University of Michigan

**Wednesday AM | March 13, 2019**
008B | Henry B. Gonzalez Convention Center

*Session Chairs:* Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

9:00 AM Invited Opportunities and Trends in Materials Engineering Research Funding at the National Science Foundation: Alexis Lewis; 1National Science Foundation

9:30 AM Invited Role of Public-private Initiatives in Scientific Research: Alan Taub; 1University of Michigan

10:00 AM Break

10:20 AM Invited The MGI and Materials Research Policy: James Warren; 1National Institute of Standards and Technology

10:50 AM Invited Program Management in a Federal Agency: John Vetrano; 1US Department of Energy

11:20 AM Invited The Interplay of Materials Research, Advocacy, and Policy Development: Charles Ward; 1Air Force Research Laboratory

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David SJohn — Magnesium Alloys

*Sponsored by:* TMS: Solidification Committee

*Program Organizers:* Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

**Wednesday AM | March 13, 2019**
006C | Henry B. Gonzalez Convention Center

*Session Chairs:* Eric Nyberg, Brunel University; Norbert Hort, Helmholtz-Zentrum Geesthacht

8:30 AM Keynote Influence of Microstructure Evolution during Twin-roll Casting on the Properties of Magnesium Sheets: Karl Kainer; Gerrit Kurz; Sven Pakulat; Dietmar Letzig; 1Helmholtz Zentrum Geesthacht

8:50 AM Invited Size Effects in Mg Alloys: Why Refinement is Well Worth It: Matthew Barnett; 1Deakin University
9:10 AM Invited
Corrosion Behavior of Mg, Al and Ti: Guang-Ling Song; Xiamen University

9:30 AM Invited
Prospects for Magnesium as an Engineering Material: Trevor Abbott; Magontec Ltd.

9:50 AM Invited
Predicting Microsegregation and Microstructural Evolution in Advanced High Pressure Die Cast Magnesium Alloys: Tracy Berman; Zhenjie Yao; Mei Li; John Allison; University of Michigan; Ford Motor Company

10:10 AM Break

10:20 AM Keynote
Hot Tearing in Magnesium Alloys: Norbert Hrt; Jiangfeng Song; Mark Easton; Helmholtz-Zentrum Geesthacht; Chongqing University; RMIT University

10:40 AM Invited
Solidification of Aluminum and Magnesium Alloys: Modeling and Experiments: Alan Luo; Ohio State University

11:00 AM Invited
Deformation Behavior of Magnesium Single Crystals: Kwang Seon Shin; Seoul National University

11:20 AM Invited
Controlling the Eutectic Microstructures of Mg based Alloys for Functional Properties: Kazuhiro Nagota; Stuart McDonald; Manjin Kim; Xuan Tran; Syo Matsumura; University of Queensland; Kyushu University

11:40 AM Invited
Advanced Characterization of Precipitates in Light Alloys: Jian-Feng Nie; Monash University

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session V

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabhi Puri, Mechanical Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kai; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Wednesday AM | March 13, 2019
301A | Henry B. Gonzalez Convention Center

Session Chairs: Josh Kacher, Georgia Tech; Yan Li, Caliofronia State University; Long Beach

8:30 AM Keynote
Ex Situ and In Situ Cyclic Crack Propagation in Microscale Tests on Pt-Ni-Al Bond Coats: Kaustubh Venkatramani; Vilram Jayaram; Indian Institute of Science

9:10 AM
In Situ Digital Image Correlation and Acoustic Emission Monitoring of Mechanically and Thermally Loaded Ceramic Materials: Michal Knapek; Jakub Kušnir; Tomáš Hulan; František Chmelík; Patrik Dobron; Štefan Csáki; Charles University; Constantine the Philosopher University in Nitra

LIGHT METALS

Ultrasonic Processing of Liquid and Solidifying Alloys — Fundamental Studies of Ultrasonic Processing

Sponsored by: TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS: Aluminum Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Kouls Pericleous, University of Greenwich; Ismail Cinoglu, Los Alamos National Laboratory; John Allison, University of Hull

Wednesday AM | March 13, 2019
006B | Henry B. Gonzalez Convention Center

Session Chairs: Dmitry Eskin, Brunel University London; Jiawei Mi, University of Hull

8:30 AM Introductory Comments

8:40 AM Invited
Investigation on Acoustic Streaming during Ultrasonic Irradiation in Aluminum Melts: Takuya Yamamoto; Sergey Komarov; Tohoku University

9:05 AM
Acoustic Cavitation Measurements and Modeling in Liquid Aluminum: Levkov Tsanaklis; Gerard Lebon; Tunky Subroto; Dmitry Eskin; Kouls Pericleous; Oxford Brookes University; Brunel University London; University of Greenwich

9:25 AM
Understanding the Highly Dynamic Phenomena in Ultrasonic Melting Process by Ultrafast Synchrotron X-ray Imaging: Jianwei Mi; Dmitry Eskin; Thomas Connolley; Kamel Madi; School of Engineering University Of Hull; Brunel University London; Diamond Light Source; Advanced Photon Source

9:45 AM
The Influence of Ultrasound on the Microstructure Formation during Solidification of A356 Ingots Processed via a 2-Zone Induction Melting Furnace: Yang Xuan; Aqi Dong; Laurentiu Nastac; The University of Alabama
10:05 AM Break

10:30 AM
Resonance from Contactless Ultrasound in Alloy Melts: Catherine Tony; Valdis Bojarevics1; Agnieszka Dybalska1; Georgi Djambazov1; William Griffiths1; Koulis Periculous1; 1University of Greenwich; 2University of Birmingham

10:50 AM
In Situ Tomographic Observation of Dendritic Growth in Mg/Al Matrix Composites: Enyu Guo2; Andre Phillion2; Zongning Chen1; Huijun Kang1; Tongmin Wang1; Peter Lee3; 1Dalian University of Technology; 2McMaster University; 3University College London

11:10 AM
Anomalous Nucleation in Undercooled Melts Processed by Electromagnetic Levitation: Robert Hyers1; Jie Zhao1; Gwendolyn Bracker1; Rainer Wunderlich1; Hans Fecht1; 1University of Massachusetts; 2Universität Ulm

11:30 AM
Modeling of the Effect of Ultrasonic Frequency and Amplitude on Acoustic Streaming: Young Ki Lee1; Jeong IL Youn1; Young Jig Kim1; 1Sungkyunkwan University

11:50 AM
Mechanisms of Grain Formation during Ultrasonic Solidification of Commercial Purity Magnesium: Nagasivamani Balasubramani1; Gui Wang1; Matthew Dargusch1; David St John1; 1University of Queensland

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Ironmaking and Steelmaking

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Oruralp Yucel, Istanbul Technical University; Ender Keskinlik, Atılım University; Rafael Padilla, University of Concepción; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Wednesday PM | March 13, 2019
208 | Henry B. Gonzalez Convention Center

Session Chairs: Baojun Zhao, University of Queensland; Zhancheng Guo, University of Science and Technology Beijing

2:00 PM Introductory Comments

2:05 PM
Sintering Characteristic and Consolidation Behavior of Chromite Fines: Xiaohui Fan1; Guojing Wang1; Min Gan1; Xuling Chen1; Zhiyun Ji1; Xunwei Zhou1; Tao Jiang1; 1Central South University

2:25 PM

2:45 PM
Dependency of Microstructure and Inclusions on the Different Growth Rate for Directionally Solidified Non-quenched and Tempered Steel: Hui Liu1; Jianbo Xie1; Honggang Zhong1; Qijie Zhai1; Jianxun Fu1; 1Shanghai university

3:05 PM
Development and Improvement of Submerged Lance Converting & Refining Furnace of Dongying Fangyuan’s Two-step Process: Zhi Wang1; Yongmao Zhou2; Qinmeng Wang3; Wuzhao Cui1; 1Dongying Fangyuan Nonferrous Metals Co Ltd; 2Central South University

3:25 PM Break

3:45 PM
Development of Offshore Steel for High Heat Input Welding: Xiaodong Ma1; Peng Zhang1; Tingliang Dong1; Feng Wang2; Baojun Zhao1; 1The University of Queensland; 2Hebei Iron and Steel Group Co., Ltd.

4:05 PM
Slag Basicity: What Does It Mean?: Geoffrey Brooks1; Mohammad Hasan2; Akbar Rhamdhani3; 1Swinburne University of Technology

4:25 PM
Flow Field and Inclusion Removal in a Continuous Casting Tundish with Channel Type Induction Heating: Haiyan Tang1; Jin Wen Liu1; Jia Quan Zhang1; Hong Xiao2; Hai Ying Yao2; Shuo Zhang2; Luzhao Guo1; Guang Hui Wu1; 1University of Science and Technology, Beijing; 2Electromagnetic Center, Hunan Zhongke Electric Co., Ltd

4:45 PM
Investigation on Clogging of Submerged Entry Nozzles for GCr15 Bearing Steels: Gong Cheng1; Lifeng Zhang1; Wenbo Wang1; Qiangqiang Wang1; Piotr Roman Scheller1; 1University of Science and Technology, Beijing; 2Chongqing University

5:05 PM Concluding Comments

SPECIAL TOPICS

2019 Institute of Metals Lecture/Robert Franklin Mehl Award — Presentation of Award and Lecture

Wednesday PM | March 13, 2019
303C | Henry B. Gonzalez Convention Center

Session Chair: Marc Meyers, University of California, San Diego

12:15 PM Introductory Comments

12:20 PM Keynote
Revisiting 'Steady-State' Monotonic and Cyclic Deformation: Emphasizing the Quasi -Stationary State of Deformation: Hael Mughrabi1; 1University of Erlangen-Nuernberg
SPECIAL TOPICS

2019 International Metallurgical Processes
Workshop for Young Scholars (IMPROWYS 2019) — Early Career Professional Forum

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Wednesday PM | March 13, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Yongqi Sun, University of Queensland; Weiling Wang, Northeastern University

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NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials:
Synthesis, Integration, and Application of Emerging Nanomaterials — Additive Manufacturing and General Nanomaterials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Wednesday PM | March 13, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Yong Lin Kong, University of Utah; Jiyoung Chang, University of Utah

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2:00 PM
Effect of MgO Content on the Properties of Magnesia Fluxed Pellets: Yuzhu Zhang; Weixing Liu; Aimin Yang; Jie Li; 1North China University of Science and Technology

2:20 PM
Effect of Quenching Temperature on Mechanical Properties and Microstructure Of High Nitrogen Martensitic Stainless Steel: Xin Cai; Xiaoyu Hu; Dian Li; 1Institute of Metal Research, Chinese Academy of Sciences

2:40 PM
Heating Rate Effects on Austenitization from Ferrite-cementite Structure during Continuous Heating: Geng Liu; Hao Chen; 1Tsinghua University

3:00 PM
Modification of Inclusions in High Strength Low Alloyed Steels: Keyan Miao; Muhammad Nabeel; Neslihan Dogan; 1McMaster University

3:20 PM Break

3:40 PM
Numerical Simulation of Three-phase Flow of Gas-stirring Micro-phenomenon during Ladle Furnace Process: Linbin Zhu; Wei Liu; Shufeng Yang; Jingwe Li; Feng Wang; Xueliang Zhang; 1University of Science & Technology Beijing

4:00 PM
The Effect of pH and Temperature during Carbonation Process on Spent Die Cleaning Solution from Aluminium Extrusion Industry: Ahmed Aalip; 1Aluminum company of Egypt

4:20 PM
The Structure Evolution Mechanism of Electrodeposited Ni Films on Steel Substrate Depending on Current Density: Xiaotao Yu; 1University of Science and Technology Beijing

4:40 PM
Improvement of Center Segregation in Continuously Cast Blooms by Convex Roll Soft Reduction: Liang Li; Xiao Zhao; Peng Lan; Zhanpeng Tie; Haiyan Tang; Jiaquan Zhang; 1University of Science and Technology Beijing
**ENERGY & ENVIRONMENT**

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries III

*Sponsored by:* TMS: High Temperature Alloys Committee

**Program Organizers:** Amil Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

**Wednesday PM | March 13, 2019**

**225A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Leela M. R. Arava, Wayne State University; George Nelson, University of Alabama, Huntsville

- **2:00 PM Keynote**
  Future Battery System Modeling and Diagnostics for Automotive Application: *Yuichiro Tabuchi*; 1Nissan Motor Co., Ltd

- **2:30 PM Invited**
  Biomass Carbon Enabled, High Performance Lithium-sulfur Batteries: *Xiaodong Li*; 1University of Virginia

- **3:10 PM**
  Understanding Hollow Metal Oxide Nanomaterial Formation with Effects of Volumetric Energy Density on Microstructure, Texture, Defects, Phases Identification and Control in Directed Energy Deposition Inconel 625+TiC Metal Matrix Composites: *Hahn Cho*; 1Kin-Ling Sham; 1Michael Koehler; 1Xianghui Xiao; 1Yang Ren; 1Manyalibo Matthews; 1Elena Garlea; 1University of Tennessee; 1Argonne National Laboratory; 1Lawrence Livermore National Laboratory; 1Y-12 National Security Complex

- **3:30 PM Break**

**TECHNICAL PROGRAM**

**WEDNESDAY PM**

**206A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Chantal Sudbrack, QuesTek Innovations LLC

**3:00 PM Invited**
Healing of Striped Boundary Defects in Direct Metal Laser Melting of Ti-64: *Kevin Chaput*; 1Edwin Schwabach; 1Sean Donegan; 1Michael Groebner; 1Air Force Research Laboratory

- **3:20 PM**
  Knit Line Microstructural and Tensile Effects in Various Selective Laser Melting (SLM) Additive Manufactured (AM) Alloys: *Ryan Anderson*; 1Stephen Cooke; 1Joseph Sims; 1ASRC Federal Astronautics

- **3:40 PM**
  Defect Signatures for Metal Laser Powder Bed Fusion: *Bradley Jared*; 1Jonathon Madison; 1Laura Swiler; 1David Saiz; 1Joshua Koepek; 1John Mitchell; 1Daryl Dagel; 1Thomas Ivanoff; 1Sandia National Laboratories

- **4:00 PM**
  Effects of Volumetric Energy Density on Microstructure, Texture, and Defect Characteristics in a Laser Powder Bed Fusion Processing: *Hahn Cho*; 1Kin-Ling Sham; 1Michael Koehler; 1Xianghui Xiao; 1Yang Ren; 1Manyalibo Matthews; 1Elena Garlea; 1University of Tennessee; 1Argonne National Laboratory; 1Lawrence Livermore National Laboratory; 1Y-12 National Security Complex

- **4:20 PM Break**

**3:30 PM**

**ADDITIONAL TECHNOLOGIES**

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Defects and Residual Stresses

*Sponsored by:* TMS: Additive Manufacturing Committee

**Program Organizers:** Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourrell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorangij, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Sematicin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

**Wednesday PM | March 13, 2019**

**221A | Henry B. Gonzalez Convention Center**

**Session Chair:** Chantal Sudbrack, QuesTek Innovations LLC

- **2:00 PM Invited**
  Healing of Striped Boundary Defects in Direct Metal Laser Melting of Ti-64: *Kevin Chaput*; 1Edwin Schwabach; 1Sean Donegan; 1Michael Groebner; 1Air Force Research Laboratory

- **2:30 PM**
  Knit Line Microstructural and Tensile Effects in Various Selective Laser Melting (SLM) Additive Manufactured (AM) Alloys: *Ryan Anderson*; 1Stephen Cooke; 1Joseph Sims; 1ASRC Federal Astronautics

- **2:50 PM**
  Defect Signatures for Metal Laser Powder Bed Fusion: *Bradley Jared*; 1Jonathon Madison; 1Laura Swiler; 1David Saiz; 1Joshua Koepek; 1John Mitchell; 1Daryl Dagel; 1Thomas Ivanoff; 1Sandia National Laboratories

- **3:10 PM**
  Effects of Volumetric Energy Density on Microstructure, Texture, and Defect Characteristics in a Laser Powder Bed Fusion Processing: *Hahn Cho*; 1Kin-Ling Sham; 1Michael Koehler; 1Xianghui Xiao; 1Yang Ren; 1Manyalibo Matthews; 1Elena Garlea; 1University of Tennessee; 1Argonne National Laboratory; 1Lawrence Livermore National Laboratory; 1Y-12 National Security Complex

- **3:30 PM Break**

**3:50 PM**

**DEFECTS AND RESIDUAL STRESSES**

Local Residual Stress Measurement of AM Materials at the Micron Scale: *Joseph Newkirk*; 1Elizabeth Burns; 1Missouri University of Science and Technology

**4:30 PM**

**Predicting Residuals Stress of AM Parts as a Function of SLM Process Parameters Using Experiments and Simulation:** *Umberto Scipioni Bertoldi*; 1Cornelia Altenbuchner; 1Richard Otis; 1Eleftherios Gdoutos; 1Andrew Shapiro; 1Julie Schoenung; 1University of California Irvine; 1NASA JPL; 1California Institute of Technology
4:50 PM
Comparison of Reduced Order Numerical Residual Stress Predictions to Neutron Diffraction Measurements of Laser Powder Bed Fusion Parts: Kyle Johnson¹; Donald Brown²; Bjorn Clausen³; Bradley Jared⁴; Kurtis Ford⁵; Joseph Bishop⁶; ¹Sandia National Laboratories; ²Los Alamos National Laboratory

5:10 PM
Uncertainty Quantification of Powder Bed Fusion Distortion and Residual Stress Predictions: Piush Ranade¹; Brijesh Kumar²; Alonso Peralta³; Mustafa Megahed⁴; ¹Honeywell Aerospace; ²Esi Group

ADDITIVE TECHNOLOGIES

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Multi-scale Modeling

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Wednesday PM | March 13, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Kevin Chaput, Air Force Research Laboratory; Alex Plotkowski, Oak Ridge National Laboratory

2:00 PM Invited
Multi-scale Simulation of Solidification Microstructure Evolution in a Binary Alloy during Laser Additive Manufacturing: Yachao Wang¹; Jing Shi²; ¹University of Cincinnati

2:30 PM
Shaping Laser Beam for Microstructural Control during Metal Additive Manufacturing: Rongpei Shi¹; Saad Khairallah²; Tien Roehling³; Joseph Mckeown⁴; Manyalibo Matthews⁵; ¹Lawrence Livermore National Laboratory

2:50 PM
Effects of Scan Pattern on Solidification Condition and Resultant Grain Structure in Electron Beam Additive Manufacturing: A Model-based Investigation: Wenda Tan¹; Shardul Kamat¹; Xuxiao Li¹; Benjamin Stump²; Alex Plotkowski³; ¹University Of Utah; ²Oak Ridge National Laboratory

3:10 PM
Microstructure and Mechanical Property Prediction of Additively Manufactured H13 Tool Steel via Integrated Computational Materials Modeling: Neil Bailey¹; Yung Shin¹; ¹Purdue University

3:30 PM Break

4:00 PM
Fatigue Behavior of Selective Laser Melted Porous Iron in Air and in Simulated Body Fluid: Yageng Li¹; Xiangyu Zhang²; Karel Lietoert³; Marius Leeflang¹; Behdad Pouran⁴; Harrie Weerands¹; Jie Zhou¹; Amir Zadpoor¹; ¹Delft University of Technology; ²Tsinghua University; ³3D Systems Leuven; ⁴University Medical Center Utrecht

4:20 PM
Finite Element Failure Analysis of Lattice Structures: Behzad Bahrami Babamir; Andrew Minor¹; Hesam Askari²; ¹University of Alabama in Huntsville; ²The University of Rochester

4:40 PM
Fracture Toughness and Fatigue Strength of Selective Laser Melted Aluminium-Silicon: An Overview: Leonhard Hitzler¹; Enes Sert²; Markus Merkel³; Andreas Ochsner¹; Ewald Werner¹; ¹Technical University Munich; ²Esslingen University of Applied Sciences; ³Aalen University of Applied Sciences
ADDITIONAL TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Al- and Cu-based Systems

Sponsored by: TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

Program Organizers: Biju Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday PM | March 13, 2019
221C | Henry B. Gonzalez Convention Center
Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Mark Jeppson, Loughborough University

2:00 PM Invited
Microstructure Evolution in Nickel Aluminium Bronze Produced by Wire Arc Additive Manufacturing for Marine Applications: Constantinos Goulas1; Wei Ya1; Marcel Hermans2; Ian Richardson3
1Rotterdam Fieldlab Additive Manufacturing / TU Delft; 2Rotterdam Fieldlab Additive Manufacturing / University of Twente; 3TU Delft

2:30 PM
The Morphology, Crystallography, and Chemistry of Phases in Wire-arc Additively Manufactured Nickel Aluminum Bronze: Dharmendra Chalasani1; Amir Hadadzadeh1; Babak Salchi Amirkhizii; Mohsen Mohammadi1; 1Marine Additive Manufacturing Centre of Excellence; 2CanmetMATERIALS

2:50 PM
Local Variations in Dissolved Si and Mechanical Properties within Additively Manufactured AlSi10Mg Parts: John Fite1; Tim Welhs1; John Slotwinski1; 1Johns Hopkins University

3:10 PM
Operando Quantification of the Phase Transformations in Additive Manufacturing: Samuel Clark1; Chu Lun Alex Leung1; Yunhui Chen1; Lorna Sinclair2; Sebastian Marussi3; Andre Phillion1; Leigh Stanger1; Jon Willmott1; Mohammed Alazemi4; Robert Attwood5; Margie Olbino6; Alexander Rack6; Veijo Honkimaki6; Peter Lee6
1University of Colorado; 2University of Manchester; 3McMaster University; 4University of Sheffield; 5Diamond Light Source; 6European Synchrotron Radiation Facility

3:30 PM Break

3:50 PM
Microstructure Evolution in Al-Ce and Al-Co Systems During Laser Glazing: Cain Hung1; Yu Sun1; Sanjeev Nayak1; Rainer Heber1; Pamir Alpay1; 1University of Connecticut

4:10 PM
Effect of Single Pass Laser Surface Treatment on Microstructure Evolution of Inoculated Zr47.5Cu45.5Al5Co2 and Non Inoculated Zr65Cu15Al10Ni10 Bulk Metallic Glass Matrix Composites: Muhammad Rafique1; Milan Brandt1; 1RMIT University

ADDITIONAL TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM I

Sponsored by: TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorangji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Wednesday PM | March 13, 2019
221D | Henry B. Gonzalez Convention Center
Session Chairs: Eric Ott, GE Additive; Hunter Martin, HRL Labs

2:00 PM Invited
Nickel-base Superalloy Design for Direct Metal Laser Melting: Laura Dietz1; Timothy Hanton2; Voramon Dheeradhada3; Vipul Gupta2; Andrew Wasserman4; 1GE Global Research; 2GE Additive

2:30 PM
The Development of a First-generation Gamma Prime Strengthened Nickel-based Superalloy for High Temperature Applications: Andre Nemeth1; David Cradden2; Sabin Sulzer3; Paul Bagot1; Michael Moody1; Roger Reed3; 1Oxmet Technologies Ltd; 2University of Oxford

2:50 PM
Design of Gamma-prime Strengthened Co-based Superalloys for Additive Manufacturing Applications: Eric Lass1; 1National Institute of Standards and Technology

3:10 PM
Design and Development of WSU 100 Nickel-base Superalloy for Additive Manufacturing: Guru Dinda1; Abhishek Ramakrishnan2; Husein Alrehaili3; Praween Sreeramagiri3; Ajay Bhagavatam3; 1Wayne State University

3:30 PM
Development of Superelastic Nickel-Titanium-Hafnium Alloys for Additive Manufacturing: Behnam Aminahmadi1; Tom Duerig2; Ronald Nobe2; Aaron Stebner3; 1Colorado School Of Mines; 2Confluent Medical Technologies; 3NASA Glenn Research Center

3:50 PM Break

4:10 PM Invited
Materials Development for Solid-state Additive Manufacturing Processes: Olaf Andersen1; Thomas Stuchltzky2; Bernd Kieback2; 1Fraunhofer IFAM; 2Technische Universität Dresden

4:40 PM
Aluminum-cerium Alloys Tailored to the Direct Metal Write (DMW) Additive Manufacturing (AM): Max Neveu1; Michael Kesler1; Hunter Henderson1; Zachary Sims1; William Carter1; Tian Li1; Orlando Rios1; 1Oak Ridge National Laboratory; 2Lawrence Livermore National Laboratory

5:00 PM
New Al-Ce Alloys for Additive Manufacturing: Ryan Dehoff1; Alex Plotkowski1; List Fred2; Peeyush Nandwana3; Hunter Henderson3; Rios Orlando1; 1Oak Ridge National Laboratory
ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Extrusion, Powder Lithography, Direct Write

Sponsored by: TMS: Powder Materials Committee, TMS: Additive Manufacturing Committee

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

Wednesday PM | March 13, 2019
223 | Henry B. Gonzalez Convention Center

Session Chair: James Paramore, United States Army Research Laboratory

2:00 PM Invited
Additive Manufacturing using Ordered Powder Lithography: Matthew Holcomb1; Grid Logic Incorporated

2:40 PM Invited
Processing and Print Parameters in BMD-based Additive Manufacturing: Alexander Barbati2; Desktop Metal

3:20 PM Break

3:40 PM
Shaping, Debinding and Sintering as a Low Cost Additive Manufacturing Method of Solid Metal Compounds: Yvonne Thompson1; Joamin Gonzalez-Gutierrez2; Christian Kukla3; Peter Felfer1; WWI FAU Erlangen; Montanuniversität Leoben

4:00 PM
Sintering Kinetics in Direct Ink Write Additive Manufacturing: A Mesoscopic Modeling Approach: Fadi Abdeljawad1; Dan Bolintineanu2; Adam Cook3; Harlan Brown-Shaklee4; Christopher DiAntonio5; Dan Kammler6; Allen Roach7; Clemson University; Sandia National Laboratories

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VI

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Blieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Panteleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Wednesday PM | March 13, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: Samantha Daly, University of California, Santa Barbara; Shujuan Wang, Los Alamos National Laboratory

2:00 PM Invited
Experimental and Numerical Characterization of Local Stresses Associated with Twinning in HCP Magnesium: Carlos Tomé1; M Arul Kumar2; Hareesh Tummala2; Yue Liu3; Rodney McCabe3; Bjorn Claussen4; Laurent Capolungo5; Wenjun Liu6; Jon Tischler7; Jian Wang8; Los Alamos National Laboratory; Shanghai Jiao Tong University; Argonne National Laboratory; University of Nebraska-Lincoln

2:30 PM
Crystal Plasticity Model for Discrete Evolution of Deformation Twinning in HCP Metals and Alloys: Satyapriya Gupta1; Philip Eisenlohr1; Michigan State University

2:50 PM
A Statistical Analysis of Twinning in Rare Earth Magnesium Alloy WE43 Using Fully Automated Post-processing in MTEX: Daniel Savage1; Saeede Ghorbanpour2; William Feather3; Marko Knezevic4; University of New Hampshire

3:10 PM
Deformation Twinning under Stress Gradient in Body-centered Cubic Tantalum and Niobium: Kui Du1; Binbin Jiang2; Aidong Tu3; Hao Wang4; Hengqiang Ye5; Institute Of Metal Research, Cas

3:30 PM Break

3:50 PM Invited
Characterizing Microstructure-property Relationships through Microscale Strain Mapping and Large Data Analysis: Zhe Chen6; University of California, Santa Barbara

4:20 PM
Fundamental Issues Associated with [11-22] Twinning in Titanium: Mingyu Gong1; Dongyue Xie2; Shun Xu3; Shujuan Wang4; Christophe Schuman1; Jean-Sébastien Lecomte5; Jian Wang6; University of Nebraska-Lincoln; Los Alamos National Laboratory; Université de Lorraine

4:40 PM
In Situ High Resolution TEM on Twinning Nucleation in BCC Crystals: Scott Mao1; Jiangwei Wang2; University of Pittsburgh; Zhejiang University

5:00 PM
Three-dimensional Nature of [0-112] Deformation Twin in Magnesium: Pengzheng Tang1; Mingyu Gong2; Yue Liu3; Rodney McCabe3; Jian Wang4; Carlos Tomé5; Shanghai Jiao Tong University; University of Nebraska-Lincoln; Los Alamos National Laboratory
5:20 PM
Microstructural Evaluation of the Onset of Deformation Twinning in FCC Metals at High Strain Rate: Daniel Foley; Kyle Matthews; Cassandra Pate; Nicholas Savino; Asher Leff; Marc De Graef; Mitra Taherli; 1Drexel University; 2Army Research Laboratory, Adelphi Laboratory Center; 3Carnegie Mellon University

5:40 PM
Deformation Behavior during Bending in AA6xxx Alloys: Sin Ting Cynthia Chang; Miroslav Smid; Ivo Kubena; Samy Hocine; Helena Van Swygenhoven; 1Paul Scherrer Institute; 2Institute of Physics of Materials ASCR

ENERGY & ENVIRONMENT


Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Wednesday PM | March 13, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Kevin Byerly, National Energy Technology Laboratory

2:00 PM Invited
FeNi-based Metal Amorphous Nanocomposite (MANC) Soft Magnetic Materials (SMM) for Motor Applications: Michael McHenry; Natan Arohime; Satoru Simizu; Paul Ohodnicki; Kevin Byerly; 1Carnegie Mellon University

2:30 PM Invited
High Resistivity Magnetic Grain Boundary Nano-inclusions for Concurrent Ultra Low Loss and Sustained High Permeability in Ferrite Inductor Cores: Parisa Andalibi; Alexander Sokolov; Afam Nwokolo; David Pleteau; Charles Evans; Justin Paik; William Fowler; Vincent Harris; 1Northeastern University

3:00 PM
High Temperature Performance of Soft Magnetic Nanocomposites: Alex Leary; Vladimir Keylin; Grant Feichter; Ron Nobebe; Randy Bowman; 1NASA GRC

3:20 PM
Magnetic Properties of Single Crystalline Itinerant Ferromagnet AlFeSi$_2$BSi$_2$: Tej Lamichhane; Li Xiang; Qisheng Lin; Tribhuwan Pandey; David Parker; Tae-Hoon Kim; Lin Zhou; Matthew Kramer; Sergey Bud’ko; Paul Canfield; 1Iowa State University; 2AMES Laboratory; 3Oak Ridge National Laboratory

3:40 PM Break

4:00 PM
Melt Spun Flake Pressed Fe-6.5%Si Bulk Soft Magnet with Superior Magnetic and Mechanical Properties: Gao Yuan Ouyang; Brandt Jensen; Kevin Dennis; Wei Tang; Chaochao Pan; Jun Cui; 1Iowa State University; 2AMES Laboratory

4:20 PM
Minnearloy: A New Soft Magnetic Material with High Saturation Flux Density: Md Mehedi; Yanfeng Jiang; Bin Ma; Pranav Suril; David Flannigan; Jianping Wang; 1CEMS, University of Minnesota; 2EEC, University of Minnesota

4:40 PM Invited
Phase Evolution of Nanostructured Fe-Si-Al-based Intermetallic Phases in Soft Magnetic Alloys: Matthew Willard; Maria Danili; 1Case Western Reserve University; 2Bard High School Early College
**ADVANCED MATERIALS**

**Advanced Materials and Reservoir Engineering for Extreme Oil & Gas Environments III — Session II**

**Sponsored by:** TMS: Energy Conversion and Storage Committee

**Program Organizers:** Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver; Partha Ganguly, Baker Hughes GE

**Wednesday PM | March 13, 2019**

**206A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Ting Chen Roy, Welldiver; Indranil Roy, UniPolar Technology Inc

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**2:00 PM Invited**

**Corrosion of Al0.1CoCrFeNi High Entropy Alloy in a Molten Eutectic Salt:** Vilupanur Ravi; J. Logleri; A. Jalbuenra; R. Mishra; Xinyi Wang; J. Earthman; 1. California State Polytechnic University, PAMona; 2. University of North Texas; 3. University of California, Irvine

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**3:00 PM**

**Corrosion Evaluation of Oilfield Alloys by Means of Various Techniques:** Ting Chen; Saadedine Tebbal; Antonio Hernandez; 1. SET Laboratories Inc.

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**3:20 PM**

**Synthesis of Disruptive Technologies and Innovations in Nanomaterials for Economizing Oil & Gas Operations:** Ting Chen Roy; Ram Shenoy; Indranil Roy; Jing Zhou; 1. WellDiver/SET Laboratories Inc.; 2. WellDiver; 3. Rice University

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**3:40 PM Break**

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**4:00 PM**

**Disintegrable Metals and Field Applications – The State of Technology:** Zhiyue Xu; Zhihui Zhang; 1. Baker Hughes, a GE Company

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**4:20 PM**

**Response of our Dissolvable Alloy to Oilfield Brines in Comparison to its Commercial Counterparts:** Ting Chen Roy; Ram Shenoy; Anuvind Akula; Vanessa Finzetto; Indranil Roy; Jing Zhou; 1. WellDiver/SET Laboratories Inc.; 2. WellDiver; 3. University of Houston; 4. Rice University

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**ELECTRONIC MATERIALS**

**Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder – 3D Microelectronic Packaging and Emerging Interconnects II**

**Sponsored by:** TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

**Wednesday PM | March 13, 2019**

**216A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Yan Li, Intel Co.; Chih Chen, National Chao Tung University

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**2:00 PM Invited**

**Pressure and Pressureless Silver Sintering of SiC MOSFET Power Module with Si3N4 Direct Bonded Copper:** Won Sik Hong; Mi Song Kim; Chulmin Oh; 1. Korea Electronics Technology Institute

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**2:30 PM**

**Direct Bonding of Nanotwinned Ag Thin Films at Low Temperature:** Leh-Ping Chang; Fan-Yi Ouyang; Shin-Yi Huang; 1. National Tsing Hua University; 2. Industrial Technology Research Institute

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**2:50 PM**

**Study the Microstructure Evolution of Cu/In and Cu/In/Ni for Fine Pitch Interconnects:** Yi-Wun Wang; Han-Tang Hung; Yu-Shan Chiu; C.R. Kao; 1. National Taiwan University

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**3:10 PM**

**Low-temperature and Pressureless Cu-to-Cu Bonding By Microfluidic Electroless Interconnection Process:** Han-Tang Hung; 1. National Taiwan University

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**3:30 PM Break**

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**3:50 PM**

**Microstructural Evolution of High (111)-Oriented Nanotwinned Copper during Annealing and Low Temperature Cu-Cu Direct Bonding Process:** Yung-Ting Tai; Fan-Yi Ouyang; Yu-Shien Lu; Leh-Ping Chang; 1. National Tsing Hua University

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**4:10 PM**

**Chip-to-chip Cu Direct Bonding in N2 Ambient with (111)-Oriented Nanotwinned Cu Microbumps:** Kai-Cheng Shie; Jia-Ye Juang; Yu-Jin Li; Po-Ning Hsu; K. N. Tu; Chih Chen; 1. National Chiao Tung University

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**4:30 PM**

**Low Temperature Cu-to-Cu Direct Bonding with Chemical Mechanical Planarized Highly <111>-orientated Nanotwinned Cu Films:** Hong-Chie Liu; Chih Chen; 1. National Chiao Tung University
### TECHNICAL PROGRAM

**Wednesday PM | March 13, 2019**

**302B | Henry B. Gonzalez Convention Center**

**Session Chair:** Neslihan Dogan, McMaster University

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**2:00 PM Invited**

**Effect of CaO Substitution with BaO in Steelmaking-based Slags for Development of Fluorine-free Slag Refining:** Zhanjun Wang; Il Sohn; 1Yonsei University

**Study of Mold Flux Heat Transfer Property by Using Thermal Imaging Enhanced Inferred Emitter Technique:** Kaixuan Zhang; Wanlin Wang; Haihui Zhang; Central South University

**2:50 PM**

**Sub-rapid Solidification Study by Using Droplet Solidification Technique:** Cheng Lu; Wanlin Wang; Central South University

**3:10 PM**

**Time Evolution of AHSS Oxidation:** Mary Story; Bryan Webler; Carnegie Mellon University

**3:30 PM Break**

**3:50 PM**

**Comparison of Dissolution Kinetics of Non-metallic Inclusions in Steelmaking Slags:** Mukesh Sharma; Neslihan Dogan; McMaster University

**4:10 PM**

**Imaging Pyrometry – An Overview:** Ravindra Nuggehalli; New Jersey Institute of Technology

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**MATERIALS DESIGN**

**Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Crystal Plasticity Methods I**

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Srujan Rokkam, Def-Aero. Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingerville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

**Wednesday PM | March 13, 2019**

**303C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Jeffrey Lloyd, US Army Research Laboratory; Marat Latypov, University of California, Santa Barbara

**2:00 PM Invited**

**Shape and Size-dependent Micropolar Crystal Plasticity for the Role of Annealing Twins in Micromechanics of Ni-base Superalloys:** Marat Latypov; Jean-Charles Stinville; Jason Mayeur; Tresa Pollock; Irene Beyerlein; University of California, Santa Barbara; CFD Research Corporation

**2:30 PM**

**A Multiphysics, Mesoscale Framework to Predict the Effect of Diffusion on Creep-fatigue Life for High Temperature Applications:** Andrea Rovinelli; Mark Messner; David Parks; T-L. Sham; Argonne National Laboratory; Massachusetts Institute of Technology

**3:30 PM Break**

**3:50 PM**

**Oxidation of FeCrAlY Surface by High Temperature Exposure to CO2 at Elevated Pressure and CO2/O2 Mixture:** Wei Yang; Kenneth Stowers; Michael F. Meyers; Frederick G. Locock; Christopher C. Katsarakis; Columbia University; Sandia National Laboratories; US Army Research Laboratory; CuNanTechnologies Inc

**4:20 PM**

**High-throughput Crystal Plasticity Simulations of Intergranular Damage and Failure:** Thao Nguyen; DJ Luscher; Justin Wilherson; Texas A&M University; Los Alamos National Laboratory

**4:40 PM**

**Simulating Particle-initiated Failure in Strongly Anisotropic Metals:** Jeffrey Lloyd; US Army Research Laboratory

**5:00 PM**

**Macro-zone Size Effect in Ti Alloys Computed with FFT-based Crystal EVP Simulations:** Azdine Nait-ali; Samuel Hémery; Institut Pprime

**5:20 PM**

**Eulerian Formulation for Brittle Fragmentation Using Continuum Damage Mechanics:** Vinamra Agrawal; Auburn University
MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Applications of Algorithms for Study and Design of Materials


Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Speerat, University of Florida; Churudatta Phatak, Argonne National Laboratory; Srinivasan Sivilliputhur, University of North Texas

Wednesday PM | March 13, 2019
304A | Henry B. Gonzalez Convention Center

Session Chair: Vahid Tari, Eaton Corporate Research & Technology

2:00 PM
Phase-field Modeling of the Effect of Deformed State on Recrystallization in Metals: Ahmed Hamed1; Larry Aagesen2; Grethe Winther3; David Hurley4; Anter El-Azab1; 2Purdue University; 3Idaho National Laboratory; 4Technical University of Denmark

2:20 PM
Viscoplastic self-consistent Modeling of High Speed Machining of Dual Phase Ti-6Al-4V Using the Mechanical Threshold Stress Flow Stress Model: Jason Allen1; Eric Hoar2; Elham Mirkhoob3; Peter Bocchini1; Anthony Rollett1; Steven Liang1; Hamid Garmentani4; 1Georgia Institute of Technology; 2The Boeing Company; 3Carnegie Mellon University

2:40 PM
Buoyancy-induced Flow Pattern during Dendritic Solidification: Elaheh Dorari1; Mohsen Eshrangi2; Sergio Felicelli1; 1The University of Akron; 2California State University, Los Angeles

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session VI

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascon, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Morii, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Wednesday PM | March 13, 2019
216B | Henry B. Gonzalez Convention Center

Session Chairs: Sinn-wen Chen, National Tsing Hua University; Chien-Neng Liao, National Tsing Hua University

2:00 PM Invited
Materials Informatics of Thermoelectric Materials Using Big Literature Data: Yuhi Tsuda1; Riku Satoh1; Yuki Ando1; Sakiko Gunji1; Yoji Imai1; Kaoru Kimura1; Koji Tsuda1; 1University of Tokyo; NIMS; 2RIKEN, Sakura Internet Inc.; 3RIKEN, NIMS

2:20 PM Invited
Nowotny Chimney Ladder Phases for Thermoelectric Applications: Xi Chen1; 1The University of Texas at Austin

2:40 PM Invited
Current-induced Boundary Modification and Precipitation in Telluride Based Thermoelectric Materials: Chien-Neng Liao1; Yao-Hsiang Chen1; Chun-Yen Lan1; 1National Tsing Hua University

3:00 PM Invited
Optical Properties of Thermoelectric Materials: Peng Jiang1; 1Dalian Institute of Chemical Physics, Chinese Academy of Sciences

3:20 PM Invited
Origin of the Ultralow Thermal Conductivity in Single-crystalline SnSe: Pai-Chun Wei1; Cheng-Rong Hsing1; Ching-Ming Wei1; 1King Abdullah University of Science and Technology; 2Academia Sinica

3:40 PM Break

4:00 PM Invited
Suppression of Atom Motion and Metal Deposition in Mixed Ionic/Electronic Conductors: Xiaofei Qiu1; Xun Shi1; Lidong Chen1; 1Shanghai Institute of Ceramics, Chinese Academy of Sciences

4:20 PM Invited
Neutron Scattering Study on the Lattice Thermal Conductivity of Sb-doped ZrNiSn: Jie Ma1; Qingyong Ren1; Chenguang Fu2; Jiong Yang2; Tiejun Zhu2; 1Shanghai Jiao Tong University; 2Max Planck Institute for Chemical Physics of Solids; 3Shanghai University; 4Zhejiang University

4:40 PM Invited
Lattice Dynamics of Layered AMg2Pn2 Zintl Compounds: Alexandra Zavalkhini1; Wanyue Peng1; Guido Petretto2; Geoffrey Hautier2; 1Michigan State University; 2U. Louvain

5:00 PM
Oxide Diffusion Mechanism and their Effect on the Microstructure and Thermoelectric Properties of p-Type Bi0.5Sb1.5Te3 Alloys: May Litha Lwin1; Peyala Dharmaiah1; Babu Madavalli1; Lee Chul-Hee1; Shin Dong-won1; Jeong Kwang-yong1; Hong Soon-Jik1; 1Kongju National University

5:20 PM Concluding Comments

LIGHT METALS

Alumina & Bauxite — Bauxite Residue: Management and Valorization

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

Wednesday PM | March 13, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Katy Tsesmelis, International Aluminium Institute; Markus Graefe, Emirates Global Aluminium; Talitha Santini, The University of Western Australia; Sumedh Gostu, Air-Liquide

2:00 PM Introductory Comments

2:05 PM
Use of Two Filtration Stages for Bauxite Residue: Roberto Seno1; Rodrigo Moreno2; Heri Nakhumara3; 1CBA

2:30 PM
Environmental Friendly Transformation Of The First And Oldest Alumina Refinery In The World: Laurent Guillaume1; 1Alteo Gardanne
2:55 PM  
Accelerating Bauxite Residue Remediation with Microbial Biotechnology: Talitha Santini1; K. Warren2; M. Raudsepp1; N. Carter1; A. Chu1; J. Hamilton2; S. Cooperthwaite1; G. Southam3; G.W. Tyson4; L.A. Warren5; 1The University of Western Australia; 2The University of Queensland; 3The University of Alberta; 2Queensland University of Technology; 5The University of Toronto

3:20 PM  
Simulation and Experiment Study on Carbonization Process of Calcified Slag with Different Ventilation Modes: Guanting Liu1; Yan Liu1; Xiaolong Li1; Weihua Sun1; Zimu Zhang1; Zhang Tigan1; 1Northeastern University

3:45 PM  
Break

4:00 PM  
An Ecological Approach to the Rehabilitation of Bauxite Residue: Elisa Di Carlo1; Ronan Courtney2; 1University of Limerick

4:25 PM  
Quantitative X-ray Diffraction Study into Bauxite Residue Mineralogical Phases: John Vogrin1; Harrison Hodge2; Talitha Santini3; Hong Peng4; James Vaughan5; 1The University of Queensland; 2The University of Western Australia

4:50 PM  
Technospheric Mining of Rare Earth Elements and Refractory Metals from Bauxite Residue: Gisele Azimi1; 1University of Toronto

5:15 PM  
Migration of Iron, Aluminum and Alkali Metal within Pre-reduced-smelting Spatation of Bauxite Residue: Jian Pan1; Siwei Li2; Deqing Zhu2; Jiwei Xu2; Jianlei Chou2; 1Central South University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Characterizations and Applications of Aluminum Alloys

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

Wednesday PM | March 13, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Zhihong Jia, Chongqing University

2:00 PM Introductory Comments

2:05 PM  
Effect of Mg and Si Content in Aluminum Alloys on Friction Surfacing Processing Behavior: Jonas Ehrich1; Arne Roos2; Stefanie Hanke1; 1Universität Duisburg-Essen; 2Helmholtz-Zentrum Geesthacht

2:30 PM  
Mechanical Properties Evolution for 8xxx Foil Stock Materials by Alloy Optimization-literature Review and Experimental Research: Erik Santoro1; Josef Berneder2; Florian Simetsberger1; Martin Doberer1; 1AMAG Rolling GmbH; 2Constantia Teich GmbH

2:55 PM  
Effects of Zr Additions on Structure and Microhardness Evolution of Eutectic Al-6Ni Alloy: Chunan Suwanpreecha1; Phromphong Pandee1; Ussadawut Patakham1; David Dunand2; Chaowalit Limmameevichitr1; Kang Mongkut’s University of Technology Thonburi; 2National Metal and Materials Technology Center; 3Northwestern University

3:20 PM  
Microstructure and Mechanical Properties of an Al-Zr-Er High Temperature Alloy Microalloyed with Tungsten: Amir R. Farkoosh1; David Dunand2; David N. Seidman3; 1Northwestern University

3:45 PM Break

4:00 PM  
Effect of Nickel Foil Thickness on Microstructure and Microhardness of Steel/Aluminium Alloy Dissimilar Laser Welding Joints: Xiaonang Wang1; Xiangming Chen2; Wenping Weng1; Hiromi Nagaumi2; Soochow University

4:25 PM  
Residual Stress Characterization for Marine Gear Cases in As-cast and T5 Heat Treated Conditions with Application of Neutron Diffraction: Joshua Stroh1; Dmitry Sedlako2; 1UBC Okanagan

2:00 PM Introductory Comments

2:05 PM  
Transfer Processes in the Bath of High Amperage Aluminium Reduction Cell: Peter Polyakov1; Andrey Yasinskiy2; Andrey Zavadyak3; Andrey Polyakov4; Iliya Puzanov5; Yuri Mikhailiev6; Sergey Shakhrai7; Nikita Sharypov2; Olga Yushkova7; 1Light Metals Ltd; 2Siberian Federal University; 3RUSAL ETC

2:30 PM  
Microstructure and Properties Analysis of Aluminium Smelter Crust: Shanghao Wei1; Jingling Liu1; Chathuni Ranaweera1; Tania Grotos1; Mark Taylor1; 1NZ Product Accelerator, Department of Chemical and Materials Engineering; 2Light Metal Research Centre, University of Auckland

2:55 PM  
Sideledge in Aluminium Cells: Further Considerations Concerning the Trench at the Metal-bath Boundary: Asbjorn Solheim1; Eirik Hjertenæs2; Kati Tschöpe1; Tania Grotos2; Mark Taylor1; 1Université Laval; 2Alcoa Corporation

3:45 PM Break

4:00 PM  
Aluminum Electrolysis with Multiple Vertical Non-consumable Electrodes in a Low Temperature Electrolyte: Guðmundur Gunnarsson1; Guðbjörg Öskarsdóttir2; Sindri Frostason2; Jon Magnússon1; 1Innovation Center Iceland; 2Arctus Metals ehf.

4:25 PM  
Anode Overvoltages on the Industrial Carbon Blocks: Peter Polyakov1; Andrey Yasinskiy2; Andrey Polyakov4; Andrey Zavadyak3; Yuri Mikhailiev6; Iliya Puzanov5; 1Light Metals Ltd; 2Siberian Federal University; 3RUSAL ETC
4:50 PM  
Development of a Drag Probe for In-situ Velocity Measurement of Molten Aluminum in Electrolysis Cell: Samaneh Poursaman; Donald Picard; Donald Ziegler; Louis Gosselin; Mario Fafard; 1Aluminium Research Centre - REGAL, Laval University; 2Alcoa Primary Metals, Alcoa Technical Center

5:15 PM  
Concluding Comments

**BIOMATERIALS**

**BIOMATERIALS**

Bio-Nano Interfaces and Engineering Applications — Bionano Interfaces V

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

**Wednesday PM | March 13, 2019**

**217C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Hendrik Heinz, University of Colorado; Kalpana Katti, North Dakota State University

**2:00 PM Invited**
Collagen-mineral Interactions Impact Macroscale Properties of Fibril in Bone: Dinesh Katti; Kalpana Katti; 1North Dakota State University

**2:30 PM Invited**
Atomic Scale Chemical Imaging of Interfaces and Interphases in Tooth Biominerals: Derk Joester; 1Northwestern University

**3:00 PM Invited**
The Interaction of Gold Nanoparticles with Biomolecules: Insights from Atomistic and Multiscale Simulations: Stefano Corni; 1University of Padova

**3:30 PM Break**

**3:50 PM Invited**
Predicting Spatial Organization of Amino Acids and Peptides on Graphene Surfaces: Tiffany Walsh; 1Deakin University

**4:20 PM Invited**
Density of Hydroxyapatite as a Function of pH: Sam Hoff; Juan Liu; Hendrik Heinz; 1University of Colorado Boulder

**4:50 PM**
Binding Mechanisms of All 20 Natural Amino Acids to (hkl) Facets of Hydroxyapatite as a Function of pH: Sam Hoff; Juan Liu; Hendrik Heinz; 1University of Colorado Boulder

**BIOLOGICAL MATERIALS**

Biological Materials Science — Biomaterials (Implants and Devices)

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

**Wednesday PM | March 13, 2019**

**007D | Henry B. Gonzalez Convention Center**

**Session Chairs:** Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama

**2:00 PM Invited**
Damage Tolerance in Dental Restorative Materials: Jamie Kruzic; Carina Tanaka; 1UNSW Sydney

**2:30 PM**
Dental Materials through Microstructural Control of Phosphates: Steven Naleway; Jerry Howard; Isaac Nelson; John Colombo; Krista Carlson; 1University of Utah

**2:50 PM**
Developments in Bioabsorbable BioMg 250 Mg Alloy: Jake Edick; Raymond Decker; Stephen LeBeau; 1nanoMAG, LLC

**3:10 PM**
Investigation of Biodegradable Zn-Li-Cu Alloys for Orthopaedic and Cardiovascular Applications: Jacob Young; Ramana Reddy; 1University Of Alabama

**3:30 PM Break**

**3:50 PM Invited**
Nanoparticles Guided Non-classical Antibiofilm Efficacy for Tissue Engineering: Anil Kishen; 1University of Toronto

**4:20 PM Invited**
Bioactive Ceramic Glasses: Extracting More Value from an Existing Material: John Nycho; 1University of Alberta

**4:50 PM Invited**
Shape Optimization of Dental Restorations: Alex Fok; 1University of Minnesota

**5:20 PM**
Low Temperature Air Plasma Modification of Electrospun Soft Materials and Bio-interfaces: Vinoy Thomas; Bernabe Tucker; Kunning Xu; Paul Becker; Yogesh Vohra; 1University Of Alabama At Birmingham; 2University of Alabama in Huntsville

**5:40 PM**
Solution Deposited Hydroxyapatite: Meeting the Need for Conformal Coatings for Porous Metal Implants: Rajendra Kasinath; Stephanie Vass; Haibo Qu; Danny Ettensohi; Bryan Smith; 1DePuy Synthes (Johnson and Johnson)
**ADVANCED MATERIALS**

**Bulk Metallic Glasses XVI — Structures and Modeling I**

*Sponsored by:* TMS: Mechanical Behavior of Materials Committee

(Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique)

_Wednesday PM | March 13, 2019_  
206B | Henry B. Gonzalez Convention Center

**Session Chairs:** Wedong Li, The Goodyear Tire and Rubber Co.; Katharine Flores, Washington University

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1. **2:00 PM Invited**  
Making Glassy Solids Ductile at Room Temperature by Imparting Flexibility into Their Amorphous Structure: *Evan Ma*¹; ¹Johns Hopkins University

2. **2:20 PM Invited**  
Structural and Thermomechanical Heterogeneities in Shear Banding Dynamics in Metallic Glasses: *Xue Wang*¹; *Yanfei Gao*¹; *University Of Tennessee*

3. **2:40 PM Invited**  
Are Hints about Glass Forming Ability Hidden in the Liquid Structure?: *Juan Wang*²; *Ryogo Suzuki*²; *Anupriya Agrawal*³; *Katharine Flores*²; *Washington University*

4. **3:00 PM Invited**  
Chemical Variation Induced Nanoscale Spatial Heterogeneity in Metallic Glasses: *Neng Wang*²; *Feng Yan*²; *Lin Li²; *University of Alabama*

5. **3:20 PM Break**

6. **3:40 PM Invited**  
Combining Modeling with 4D STEM to Explore the Nanoscale Origins of Structure-property Relationship in Metallic Glasses: *Pengyang Zhao*³; *Ju Li*⁴; *Jinwoo Hwang*³; *Yunzhi Wang*³; *The Ohio State University; ³Massachusetts Institute of Technology*

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**LIGHT METALS**

**Cast Shop Technology — Melt Treatment**

*Sponsored by:* TMS Light Metals Division, TMS: Aluminum Committee

(Program Organizer: Pierre-Yves Menet, Constellium Technology Center)

_Wednesday PM | March 13, 2019_  
007B | Henry B. Gonzalez Convention Center

**Session Chair:** Johannes Morscheiser, Aleris Rolled Products Germany

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1. **2:00 PM Introductory Comments**

2. **2:05 PM**  
Furnace Atmosphere and Dissolved Hydrogen in Aluminium: *Martin Syvertsen*¹; *Anne Kvithyld*¹; *Eilif Gunderson*¹; *Inge Johansen*¹; *Thorvald Engh*²; *SINTEF Materials and Chemistry; ³SINTEF Industry; ²Hydro Aluminium; ¹Norwegian University of Science and Technology*

3. **2:25 PM**  
Miniature Vacuum Degassing System: *Allen Chan*¹; *Ray Peterson*²; *Praxair, Inc.; ³Real Alloy LLC*

4. **2:45 PM**  
Impact of the Filter Roughness on the Filtration Efficiency for Aluminium Melt Filtration: *Claudia Voigt*¹; *Lisa Ditscherlein*¹; *Eric Wenzler*¹; *Tilo Zienert*¹; *Rafal Nowak*²; *Urs Peuker*²; *Natalia Sobczak*²; *Christos G. Aneziris*²; ¹TU Bergakademie Freiberg; ²Hydro Aluminium Rolled Products GmbH

5. **3:05 PM**  
Influence of the Wetting Behavior on the Aluminium Melt Filtration: *Claudia Voigt*¹; *Lisa Ditscherlein*¹; *Eric Wenzler*¹; *Tilo Zienert*¹; *Rafal Nowak*²; *Urs Peuker*²; *Natalia Sobczak*²; *Christos G. Aneziris*²; ¹TU Bergakademie Freiberg; ²Foundry Research Institute

6. **3:25 PM Break**

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1. **3:40 PM**  
Aluminium Filtration of Bonded Particle Filters: *Britt Elin Ghielmeen*²; *Terje Haugen*²; *Inge Johansen*²; *Eilif Gunderson*²; *Shahid Akhtar*²; *Ulrik Aalborg Eriksen*²; *Sarina Bao*²; *Martin Syvertsen*²; *Anne Kvithyld*²; *Hyecast; ³Hydro; ²Norwegian University of Science and Technology; ³SINTEF Materials and Chemistry*

2. **4:00 PM**  
Evaluation of Filtration Efficiency of Ceramic Foam Filters (CFF) Using a Hydraulic Water System: *Massoud Hassanabadi*²; *Petr Bilek*²; *Shahid Akhtar*²; *Ragnhild E. Aune*²; *Martin Syvertsen*²; *Anne Kvithyld*²; ³Hyecast; ²Hydro; ²Norwegian University of Science and Technology (NTNU); ³Technical University of Liberec; ²Hydro Aluminium, Karmøy Primary Production

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**WEDNESDAY PM**

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1. **4:20 PM**  
Drain Free Filtration (DFF) – A New CFF Technology: *Ulf Tundal*¹; *Idar Steen*¹; *Åge Strømsvåg*¹; *Terje Haugen*¹; *John Olav Fagerlie*²; *Arlid Håkonsen*²; ²Hydro Aluminium; ¹Hyecast AS

2. **4:40 PM**  
Laboratory Scale Study of Reverse Priming in Aluminium Filtration: *Tanja Pettersen*²; *Martin Syvertsen*²; *Sarina Bao*²; *Freddy Syvertsen*²; *Britt Elin Ghielmeen*²; *Ulf Tundal*²; ²SINTEF Industry; ²Syvertsen Steperiinkonsult; ³Hyecast AS; ²Hydro Aluminium
5:00 PM
Estimation of Aluminum Melt Filtration Efficiency Using Automated Image Acquisition and Processing: Hannes Zedel; Robert Fitzsch; Ragnhild Aune; Carl von Ossietzky University of Oldenburg; Pyrotek, EMP Technologies Limited; Norwegian University of Science and Technology

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — In Reactor Fuel Behavior

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Anderson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC - Institute of Transuranium Elements

Saturday PM | March 16, 2019
214B | Henry B. Gonzalez Convention Center

Session Chair: Andrea Jokisaari, Idaho National Laboratory; Isabella J. Van Rooyen, Idaho National Laboratory

2:00 PM Invited
A Model of Fission Gas Release and Swelling in UO2 for Engineering Fuel Analysis: Giovanni Pastore; Lelio Luzzi; Paul Van Uffelen; Idaho National Laboratory; Politecnico di Milano; European Commission, JRC-Karlsruhe

2:30 PM Revisiting the Diffusion Mechanism of Helium in UO2: A DFT+U Study: Xiang-Yang Liu; David Andersson; Los Alamos National Laboratory

2:50 PM Multi-scale Modeling of Fission Gas Release in UO2 Nuclear Fuel: Larry Aagesen; Yongfeng Zhang; Daniel Schwen; Michael Tonks; Giovanni Pastore; Idaho National Labs; University of Florida

3:20 PM Neutron Irradiation Performance of Chemical Vapor Deposited SiC Fuel Systems at High Temperatures and Burnups: Isabella Van Rooyen; Karen Wright; Thomas Lillo; Subhashish Meher; William Skerjanc; Yong Yang; Fei Gao; Idaho National Laboratory; University of Florida; University of Michigan

3:40 PM Break

4:00 PM Invited
Irradiation Effects on Nuclear Fuel: Vincenzo Rondinella; Thierry Wiss; Dimitrios Papaioannou; Dragos Staicu; Stephane Bremer; Ondrej Benes; Paul Van Uffelen; EC-JRC

4:30 PM Probing the Thermodynamic and Kinetic Factors Adding to the Development of High Burnup Structure in UO2: Andrea Jokisaari; Idaho National Laboratory

4:50 PM Microstructural and Micro-chemical Comparisons of AGR-1 and AGR-2 TRISO UCO Fuel Kernels Irradiated in the Advanced Test Reactor: Zhenyu Fu; Lingfeng He; Isabella Rooyen; Yong Yang; University of Florida; Idaho National Laboratory

5:10 PM Characterization of the Irradiation Effects in Nuclear Graphite: Jose Arengui-Mena; Philip Edmondson; Robert Worth; Cristian Contescu; Timothy Burchell; Yutai Katoh; Oak Ridge National Laboratory; The University of Manchester

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — Imaging II

Sponsored by: TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Wednesday PM | March 13, 2019
303A | Henry B. Gonzalez Convention Center

Session Chair: Mathew Cherukara, Argonne National Laboratory

2:00 PM Invited
Exploring Ion-irradiation Damage Using Bragg Coherent X-ray Imaging and 3D Transmission Electron Microscopy: Felix Hofmann; Nicholas Phillips; Hongbing Yu; Ross Harder; Wenjun Liu; University of Oxford; Argonne National Laboratory

2:30 PM Invited
Three-dimensional Imaging of Vortex Phases in Ferroic Materials: Dmitry Karpov; Ross Harder; Turab Lookman; Edwin Fohtung; New Mexico State University; Argonne National Laboratory; Los Alamos National Laboratory; New Mexico State University/ Los Alamos National Laboratory

2:50 PM Multi-reflection Bragg Coherent Diffractive Imaging of Real-world Materials Samples: Nicholas Phillips; Ross Harder; Wenjun Liu; Ruqing Xu; Gareth Hughes; James Douglas; Paul Bagot; Felix Hofmann; University of Oxford; APS - Argonne National Laboratory

3:10 PM Direct Observation of Point to Parallel Array Cu GB Segregation Behavior in Al Alloy 7075: Prakash Parajuli; Ruben Mendoza-Cruz; Arturo Ponce; Miguel Yacamán; University of Texas at San Antonio

3:30 PM Break

3:50 PM 3D Mapping of Subgrains with High Resolution 3DXRD: Mustafacan Kutsal; Marla Majkut; Can Yildirim; Phil Cook; Yubin Zhang; Jon Wright; Carsten Dettlaff; Henning Poulsen; European Synchrotron Radiation Facility; Technical University of Denmark

4:10 PM High Throughput Nano-size Precipitates Characterization of Steels with Unprecedented Statistics: Transmission Kikuchi Diffraction on Extraction Replicas: Arunodaya Bhattacharya; Chad Parish; Jean Henry; Ying Yang; Lizhen Tan; Yutai Katoh; Oak Ridge National Laboratory; CEA-Saclay

4:30 PM Invited
Multimodal Imaging Using Hard X-ray Speckle: Marie-Christine Zdor; Diamond Light Source, University College London

4:50 PM Deformation Behavior of Functionally Graded Polymeric Foams Using X-ray Tomography: Arun Sundar Singaravelu; Jason Williams; Mark Henderson; Chris Holmes; Nikhil Shekhar; Center for 4D Materials Science, Arizona State University; Future Team, Adidas; Future Team, Adidas AG
CHARACTERIZATION
Characterization of Minerals, Metals, and Materials
— Non-ferrous Metals and Processes

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMETALLURGICALS; Shadia Ikhamayes, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday PM | March 13, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Jiann-Yang Hwang, Michigan Technological University; Pasquale Russo Spena, Politecnico di Torino

2:00 PM Introductory Comments

2:05 PM Invited

Predicting Ultrasound Resonance of Polycrystalline Materials by Multiscale Modeling: Application to Nickel-base Superalloys

Marie-Agathe Charpagne1; Benjamin Shaffer1; Emmanuel Akpan2; Brent Goodlet1; Mason Souther1; Ben Bales1; Mikhail Kirk2; Tresa Pollock3; University of California Santa Barbara; Oak Ridge National Laboratory

2:25 PM Thermodynamic Measurement Al-Li Alloy by Mass Spectrometry

Yuto Kobayashi1; Tatsuki Nagao2; Chiba Institute Of Technology

2:45 PM Adsorption Behavior of Cu(II) to Silica-humics Composite Aerogels: Guifong Han1; Pengfei Tang1; Hongyang Wu1; Jun Ma1; Xiaomeng Yang2; Yongsheng Zhang2; Zhengzhou University

3:05 PM A Combinatorial Investigation of Cu-Nb Metallic Glass Thin Films: Mohammad Abboud1; Amir Motallebzadeh2; Sezer Ozerinc3; Middle East Technical University; Koç University

3:25 PM Break

3:40 PM Inter and Transgranular Nucleation and Growth of Voids in Shock Loaded Copper Bicrystals: Elizabeth Fortin1; Benjamin Shaffer1; Saul Opie2; Matthew Catlett1; Pedro Peralta1; Arizona State University; Los Alamos National Laboratory

4:00 PM Identification of the Crystal Structure of the Ti3Pt4 Compound—Preliminary Results: Karem Tello1; Raul Cardoso-Gil2; Fernandez Arancibia3; Claudio Aguilar4; Nubia Caroca-Canales5; Michael Kaufman6; University Tecnica Federico Santa Maria; Max-Planck-Institut für Chemische Physik fester Stoffe; Colorado School of Mines

4:20 PM Influence of Strain Rate and Microstructure on the Substructure Evolution and Mechanical Properties of Ti-407: Zachary Kleine1; Gopal Viswanathan2; Matt Thomas3; M.H. Lorreto4; Hamish Fraser4; The Ohio State University; TIMET; University of Birmingham

4:40 PM Deformation Mechanisms of Mg-Zn-Y Alloys with LPSO Phase Studied by Various In-situ Methods: Claudia Horvath1; Daria Drozdenko2; Kristian Mathis3; Jan Capek2; Gerardo Garcia2; Dong Ma4; Ke An4; Patrik Dobron4; Charles University; Lab Neutron Scattering & Imaging, Paul Scherrer Institut; CENIM-CSIC; Chemical and Engineering Materials Division, Spallation Neutron Source, Oak Ridge National Laboratory

CHARACTERIZATION
Characterization of Minerals, Metals, and Materials
— Polymer and Composite Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMETALLURGICALS; Shadia Ikhamayes, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday PM | March 13, 2019
212A | Henry B. Gonzalez Convention Center

Session Chairs: Sergio Monteiro, UENF; Jin Hong Li, China University of Geosciences

2:00 PM Introductory Comments

2:05 PM Two Fibers Used in the Colombian Amazonia and Its Uses as Potential Reinforcement for Composite Materials: Henry Colorado1; Claudio Aguilar2; Universidad De Antioquia; Universidad Técnica Federico Santa Maria

2:25 PM Visualizing Stress Distribution of Ceramic/Epoxy Composite under Non-linear Deformation Using Micro-mechanical Raman Spectroscopy: Abhijeet Dhiman1; Chandra Prakash2; Vikas Tomar3; Purdue University

2:45 PM Development and Characterization of Epoxy Based Polymer Matrix Hybrid Composite Using Chicken Feather, Coir Fiber and Egg Shell Powder: Saju Kuriakose1; Sandesh Kiran Swamidas; Rajaprakash Murthunjayappoo2; University Visvesvariah College of Engineering (UVCE), Bangalore University

3:05 PM Flexural Mechanical Characterization of Polyester Composites Reinforced with Sisal Fabric: Frederico Margem1; Sergio Monteiro2; Andre Gomes1; Gienio Daniel1; Vinicius Barbosa1; Alexandre Amorin1; Victor Souza1; Uniredentor; IME

3:25 PM Break

3:40 PM Cost Evaluation of Polymeric Composites Reinforced by Natural Fibers: Felipe Perisse Duarte Lopes1; Carlos Fontes Vieira1; UENF

4:00 PM Influence of Albizia Lebbeck Benth Pods Particulate on Mechanical Properties of Low Density Polyethylene: Oluwasina Gbenebo1; Emmanuel Akpan2; Festus Osabumwenre; Samson Adeosun1; University of Lagos; Institut fur Verbundwerkstoffe
Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — AI Applied to General Materials Science

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

**Wednesday PM | March 13, 2019**

305 | Henry B. Gonzalez Convention Center

**Session Chair:** Anubhav Jain, LBNL

2:00 PM Invited

An Autonomous Characterization System for Limited-data Experimental Materials Screening: Composition Spread Thin Film Experiments: Brian DeCost; Heshan Yu; Xiaohang Zhang; Seung hun Lee; Yangang Liang; Jason Hattrick-Simpers; Ichiro Takeuchi; Aaron Kusne; 1 National Institute of Standards and Technology; 2 University of Maryland

2:30 PM

A Machine Learning Framework to Improve nanoHUB Prediction Capabilities Using Existing Tool Data: Soaketh Desai; Sam Reevé; Alejandro Strachan; 1 Purdue University

2:50 PM Invited

Characterizing the Likelihood of Success of Using Machine Learning to Design Novel Materials: Yoolhee Kim; 1 Citrine Informatics

3:20 PM

Perspectives on the Impact of Machine Learning, Deep Learning, and Artificial Intelligence on Materials, Processes, and Structures Engineering: Dennis Dimiduk; Elizabeth Holm; Stephen Nieszoda; 1 BlueQuartz Software LLC; 2 Carnegie Mellon University; 3 The Ohio State University

3:40 PM Break

4:00 PM Invited

Developing Fast-running Simulations Models for Manufacturing Using Deep Learning: Victor Castillo; 1 Lawrence Livermore National Laboratory

4:30 PM Invited

Software Tools, Crystal Descriptors, and Applications of Machine Learning Applied to Materials Design: Anubhav Jain; 1 Lawrence Berkeley Laboratory

5:00 PM

Towards Predictive Synthesis of Computer-designed Inorganic Materials: Muratahan Aykol; 1 Toyota Research Institute

**Materials Design**

Computational Materials Discovery and Design — Computational Methods for Materials Discovery and Design III

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

**Wednesday PM | March 13, 2019**

304C | Henry B. Gonzalez Convention Center

**Session Chair:** Oliver Johnson, Brigham Young University

2:00 PM

Building Microstructure Evolution Linkages for Sintering of Polycrystalline Ceramics: Yüksel Yabansu; Veronika Rehn; Johannes Hotzer; Britta Nestler; Surya Kalidindi; 1 Georgia Institute of Technology; 2 Karlsruhe Institute of Technology

2:20 PM

A Machine Learning Approach for Process Optimization of Polycrystalline Materials: Pinar Acar; 1 Virginia Tech

2:40 PM

Reduced-order Model for Microstructure Evolution Simulation in Solid Oxide Fuel Cell with Dynamic Discrepancy Reduced Modeling: Yinkai Lei; Tian-Le Cheng; You-Hai Wen; David Mebane; 1 National Energy Technology Laboratory; 2 West Virginia University

3:00 PM

Grain Growth in Yttria-doped Alumina - A Simulation Study: Philip Goins; 1 William Frazier; 1 U.S. Army Research Laboratory

3:20 PM Break

3:40 PM

CALPHAD-guided Alloy Design and Processing of Novel Ceramics and Cermets in Titanium-Boron System: K. S. Ravi Chandran; Jun Du; Vikas Jindal; Anthony Sanders; 1 University of Utah; 2 IIT-BHU; 3 Ortho Development Corpoation

4:00 PM

Multi-objective Design of Functionally Graded Materials in Multicomponent Alloy Systems: Tanner Kirk; Olga Eliseeva; Richard Malak; Raymundo Arroyave; Ibrahim Karaman; 1 Texas A&M University

4:20 PM

Optimisation of Plasticity-induced Transformations and Strengthening in TRIP/TWIP Titanium Alloys: Madeleine Bignon; Pedro Rivera Diaz-del-Castillo; Gérard Ramstein; Emmanuel Bertrand; Franck Tancrè; 1 Université de Nantes; 2 University of Lancaster
PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Microstructural Evolution I

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hasem Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

**Wednesday PM | March 13, 2019**

**225C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Emine Gulsoy, Northwestern University; Efrain Hernandez-Rivera, U.S. Army Research Laboratory

2:00 PM Invited
The Thermodynamic and Kinetic Effects of Microalloying Elements in Al-Cu Alloys: Patrick Shower1; James Morris2; Dongwon Shin3; Amit Shyam1; 1Oak Ridge National Laboratory

2:30 PM
Stabilization of Intermetallic Precipitates against Coarsening through Interface Engineering: A Phase-field Study: Sourabh Kadambi1; Fadi Abdeljawad2; Srikanth Patala1; 1North Carolina State University; 2Clemson University

2:50 PM Invited
Toward Equilibrium: Marius Stan1; Noah Paulson2; 1Argonne National Laboratory

3:20 PM Invited
Effect of Magnetic Fields on Microstructure Evolution: Philip Goins2; Heather Murdoch1; Efrain Hernandez-Rivera1; Mark Tschopp1; 1U.S. Army Research Laboratory

3:50 PM Break

4:10 PM
A Thermodynamically Consistent Phase-field Modeling Framework for Micro-elastic-viscoplasticity: Youhai Wen1; Tianle Cheng2; 1National Energy Technology Laboratory

4:30 PM
Modeling of Volume Diffusion Controlled Phase Transformations in Multiphase Multicomponent Alloy Systems by Minimization of Gibbs Energy: Anders Sottwen1; 1InnoKinetix AB

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Superalloys: Processing and Environmental-Assisted Mechanisms

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detors, National Energy Technology Laboratory

**Wednesday PM | March 13, 2019**

**301C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Sammy Tin, Illinois Institute of Technology; Akane Suzuki, GE Global Research

2:00 PM
Influence of Thermomechanical Processing and Hot Deformation on Microstructural Evolution towards Building a Comprehensive Model for Metadynamic Recrystallization Kinetics in Alloy IN625: Benjamind Adam1; Graham Tewksbury2; John Walters3; Chris Bergner1; Portland State University; 2Scientific Forming Technology Corporation; 3Forging Defense Manufacturing Consortium

2:20 PM
Hot Forging of a Nickel-base Superalloy - dynamic Recrystallisation and Deformation Mechanisms in ATI 718Plus®: Christine Kien1; Christos Argyakis1; Cathie Rae1; 1University of Cambridge; 2Rolls-Royce plc.

2:40 PM
Processing and Microstructural Conditions Contributing to Abnormal Grain Growth in Ni-based Superalloys: Byron Mcarthur1; Amy Clarke1; Kester Clarke1; Michael Kaufman2; Kevin Severs3; 1Colorado School of Mines; 2Allegheny Technologies Incorporated

3:00 PM
Microstructure and Mechanical Properties of Rotary Friction Welding of a New Wrought Ni-Fe Based Superalloy: Yaxin Xu1; Wenya Li1; 1Northwestern Polytechnical University

3:20 PM Break

3:40 PM
Tribological Behavior of Alloys 800H and 617 at Elevated Temperatures and in Impure Helium Environments: Valentín Pauly1; Malcolm Clark2; Joseph Kern3; Carter Tesch1; Oyelayo Ajayi2; Dileep Singh1; David Grierson1; Kumar Sridharan1; 1University of Wisconsin, Madison; 2Argonne National Laboratory

4:00 PM
Effect of Multiaxiality and Oxidation on the Kinetics of Microstructural Instabilities in Nickel-based Single Crystal Superalloys for Extreme Environment: Seungjun Lee1; Jean Briac le Graverend4; 1Texas A&M University

4:20 PM
Effect of the Environment and Pre-cracked Non-metallic Inclusions on Lifetime Variability of AD730TM: Adèle Govaere1; Florence Hamon2; Anne-Laure Rouffie1; Jean-Michel Franchet3; Jonathan Cormier4; Patrick Villechaise2; 1SAFRAN Tech & Institut Pprime; 2CNRS - Institut Pprime; 3SAFRAN Tech; 4ISAE-ENSMA & Institut Pprime
4:40 PM
High Temperature Oxidation of Co-base Superalloys: Investigating the 3D Structures of Oxide Scales by Means of X-ray NanoCT, FIB Tomography and Analytical TEM: Malte Lenz1; Nadine Buchinger1; Jan Rosiwal1; Yolita Eggeler1; Silvan Englisch1; Janis Wirth1; Martin Weiser1; Sannakaisa Virtanen1; Erdmann Spiecker1; 1University Erlangen, Nuernberg

SPECIAL TOPICS

Effective Business Improvement Methodologies for the Minerals, Metals, and Materials Industries

Program Organizers: Barry Sadler, Net Carbon Consulting Pty Ltd; Eric Schmidt, Vallourec Star; Robert Hyers, University of Massachusetts

Wednesday PM | March 13, 2019
303B | Henry B. Gonzalez Convention Center

Session Chair: Barry Sadler, Net Carbon Consulting Pty Ltd

2:00 PM Introductory Comments

2:10 PM
Case Studies of Continuous Improvement Projects in the Metals Industry: Cynthia Belt1; 1Metals Energy Management, LLC

2:40 PM
The Value of Investigating and Trending Minor Failures to Prevent Major Incidents: Jedediah Redman1; Nicholas Cherolis2; Daniel Benac1; Dorothy Shaffer1; 1Baker Engineering and Risk Consultants; 2Baker Engineering and Risk Consultants, Inc.

3:10 PM
Process Stability – The Key to Improvement in Mining, Smelting and Process Industries: Keith Sinclair1; 1Sinclair Associates, Inc.

3:40 PM Break

4:00 PM

4:30 PM Demonstration

4:50 PM Panel Discussion

5:20 PM Concluding Comments

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmentally Assisted Embrittlement and Failure

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Wednesday PM | March 13, 2019
214C | Henry B. Gonzalez Convention Center

Session Chairs: Reiner Kirchheim, University of Göttingen; Jian Luo, University of California, San Diego

2:00 PM Invited
Plasticity and Fracture Affected by the Uptake of Chemical Elements from the Environment: Reiner Kirchheim1; 1University of Goettingen

2:40 PM
The Effect of Hydrogen on the Plastic Deformation of Metals as Predicted from Discrete Dislocation Dynamics Simulations: Yejun Gu1,2; 1Jaafar El-Awady; 2Johns Hopkins University

3:00 PM
Environmental Influences on Crack Formation and Fracture Mechanical Behavior of a Beta-stabilized Gamma-TiAl Alloy: Christian Loeffl1,2; Holger Saage1; Mathias Göken2; 1University of Applied Sciences Landshut; 2Friedrich-Alexander-University Erlangen-Nürnberg

3:20 PM
Environmentally-assisted Cracking of a Ni-based Superalloy Closure Weld in the Presence of Rocket Propellant: David Dawicke1; Jacob Hochhatter1; Mark McClure1,2; Mika Myers1,2; James Burns1; Kirk Sneddon1; Heather Hickman1; Richard Russell1; 1Analytical Services & Materials, Inc.; 2NASA Langley Research; 3NASA White Sands Test Facility; 4University of Virginia; 5Arde Inc.; 6NASA Glenn Research Center; 7NASA Kennedy Space Center

3:40 PM Break

4:00 PM Invited
A Review of Grain Boundary Adsorption, Wetting and Transformations: Implications in Liquid Metal and Grain Boundary Embrittlement and Beyond: Jian Luo1; 1University of California, San Diego

4:40 PM
Liquid Metal Embrittlement of Austenitic Steels: Recent Results: Auger Thierry1; Bassem Barkia1; Jean-Louis Courrouau1; Fosca Di Gabrielle1; Anna Hojna3; Michal ChoCholousek2; 1CNRS/ENSAM/CNAM; 2CEA; 3CVR

5:00 PM
Liquid Metal Embrittlement of Engineering Alloys by eGaIn: Data-driven Experimental Design Using Sequential Learning: Justin Norkett1; Victoria Miller1; 1North Carolina State University
MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Load and Environment Interaction Effects on the Mechanical Response during Fatigue

Sponsored by: TMS. Computational Materials Science and Engineering Committee, TMS. Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Wednesday PM | March 13, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Jean-Briac le Graverend, Texas A&M University

2:00 PM
Characterization of the Effects of High Altitude Environments on Dislocation Structure Evolution during Fatigue Loading of 7075-T651. Adam Thompson1; Zachary Harris1; James Burns1; University of Virginia

2:20 PM
Probabilistic Dwell Fatigue Life Prediction in Microtextured Ti-6Al-4V: Sushant Jha1; Joseph Tucker2; James Larsen2; Reji John1; Adam Pilchak1; University of Dayton Research Institute; Exponent, Inc.; U.S. Air Force Research Laboratory

2:40 PM
Invitro Fatigue Behavior of NiTi Shape Memory Wire. Lakshinda Marandi1; Indrani Sen1; Indian Institute of Technology Kharagpur

3:00 PM
Short Crack Growth of Metastable Austenitic and Martensitic Stainless Steels under Hydrogen Influence. Sven Bruch1; Volker Schippel1; Hans-Jürgen Christ1; Claus-Peter Fritzeln2; Martina Schwarz1; Stefan Weihe1; Universität Siegen; Universität Stuttgart

3:20 PM Break

3:40 PM
Twining in (α+β) Titanium Alloy Submitted to Dwell Fatigue Loading. Cyril Lavogiez1; Samuel Hémery1; Patrick Villechaise1; Pprime Institute

4:00 PM Invited
Experimental and Computational Studies of Crack Growth in Steel Alloy 709 at Elevated Temperatures under Fatigue and Creep Loading. Gabriel Potirniche1; Jose Ramirez2; Nicholas Shaber3; Martin Taylor1; Robert Stephens1; Indrajit Charit1; University of Idaho

4:20 PM
The Fatigue Life of AISI 4140 in the VHCF Regime at High Temperatures. Alexander Schmiedel1; Horst Biermann1; Anja Weidner1; TU Bergakademie Freiberg

4:40 PM
Creep-fatigue Deformation in 9-Cr1MoV Base Metal and Weldments. Harrison Whitt1; Tyler Payton2; Wei Zhang1; Michael Mills2; University of Dayton Research Institute; Exponent, Inc.; University of Virginia

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Thin Film and Interface Fracture

Sponsored by: TMS Materials Processing and Manufacturing Division. TMS. Nanomechanical Materials Behavior Committee

Program Organizers: Daniel Kiener. University of Leoben; Megan Cordill. Eich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Wednesday PM | March 13, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill. Eich Schmid Institute of Materials Science; Corinne Packard, Colorado School of Mines

2:00 PM Invited
Analysis of Fracture Surface Morphology in Microscale GaAs and Ge Films. Corinne Packard1; Colorado School of Mines

2:20 PM
Interfacial Fracture Toughness of GaN Film on Diamond Substrate for Application in Ultra-high Power Radio Frequency Devices: Dong Liu1; Stephen Fabes3; Daniel Francis3; Martin Kuball1; University of Bristol; University Of Oxford; Akash Systems

2:40 PM
Dependence of the Fracture Toughness of Freestanding Metallic Thin Films on their Yield Strength and Microstructure. Benoit Merle1; Eva Preiß1; Mathias Göken1; University Erlangen, Nürnberg

3:00 PM
Alloying Effects on Ductility of Nanostructured Cu-X (X = Zr and W) Thin Films. Jiantuo Zhao1; Jinyu Zhang1; Gang Liu1; Jun Sun1; Xi’an Jiaotong University

3:20 PM Invited
Impact of Alloying and Interfaces on Fracture Toughness of Transition Metal Nitrides and Borides. Paul Mayrhofer1; TU Wien

3:40 PM Break

4:00 PM Invited
In Situ Stable Fracture of Ceramic Interfaces Tested under Environmental Conditions. Giorgio Semicola1; Finn Giulian1; Imperial College London

4:20 PM
In Situ Fracture of Reliability Relevant Interfaces in Microelectronic Devices. Markus Alfreider1; Johannes Zechner1; Daniel Kiener1; University of Leoben; KAI Kompetenzzentrum Automobil- und Industrielektronik GmbH
Materials Processing

Friction Stir Welding and Processing X — Controls and Inspection

**Sponsored by:** TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

**Wednesday PM | March 13, 2019**

**210B | Henry B. Gonzalez Convention Center**

**Session Chair:** Glenn Grant, Pacific Northwest National Laboratory

**2:00 PM Panel Discussion:** Learn from the founders - More than 100 years of experience in academic friction stir related research

**3:00 PM Invited**

Developing and Deploying FSW&P through Standardization: Dwight Burford; Joining Innovations, LLC

**3:20 PM**

Economics of Commercialization: An Industrial Case Study of How to Resolving CAPEX and OPEX Barriers: Dale Fleck; MegaStir

**3:40 PM Break**

**4:00 PM**

Advances in Signal Processing for Friction Stir Welding Temperature Control: Brandon Taysom; Carl Sorensen; Brigham Young University

**4:20 PM Invited**

Improved Techniques Tool Temperature Measurement, Reporting and Interpretation: Kenneth Ross; Scott Whalen; Md Reza-E-Rabby; Martin McDonnell; Pacific Northwest National Laboratory; U.S. Army - TARDEC

**4:40 PM**

Using Spindle Speed vs Spindle Power as the Manipulated Variable for Temperature Control in Friction Stir Welding: Brandon Taysom; Carl Sorensen; Brigham Young University

**5:00 PM**

Intermittent Flow of Material and Force Based Defect Detection during Friction Stir Welding of Aluminum Alloys: Daniel Franke; Michael Zinn; Frank Pfefferkorn; University of Wisconsin, Madison

**5:20 PM**

Realization of Conventional, Stationary Shoulder and Dual Rotation FSW with an Adaptive FSW Spindle Construction: Michael Grätzel; Konstantin Schick-Witte; Jean Pierre Bergmann; Technische Universität Ilmenau

Materials Processing

Friction Stir Welding and Processing X — Lightweight Materials

**Sponsored by:** TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

**Wednesday PM | March 13, 2019**

**210A | Henry B. Gonzalez Convention Center**

**Session Chairs:** David Yan, San Jose State University; Enkhalsaikhan Boldsaikhan; Wichita State University

**2:00 PM Panel Discussion:** Learn from the founders - More than 100 years of experience in academic friction stir related research

**3:00 PM Invited**

High Speed Friction Stir Lap Welding of Al Alloys: Piyush Upadhyay; Xia Li; Tim Roosendaal; Pacific Northwest National Laboratory; Pacific Northwest National Laboratory

**3:20 PM**

Processing and Properties of Engineered Metal Matrix Composites Produced Via Co-Extrusion for High-temperature Friction Stir Welding: Paul Brune; Jeremy Watts; Gregory Hilmas; Missouri University of Science and Technology

**3:40 PM Break**

**4:00 PM Invited**

Friction Stir Welding of Lap Joints using New Al-Li Alloys for Stringer-skin Joints: Egoitz Aldanondo; Ekaitz Arruti; Alberto Echeverria; Inaki Hurtado; IK4-LOREK; Mondragon Unibertsitatea, Faculty of Engineering (MU-ENG)

**4:20 PM**

Tool Shoulder End Features on Material Flow and Mechanical Properties during Friction Stir Welding of Al-Mg-Si Alloy: Krishna Kishore Mugada; Kumar Adepu; Gayatri Vidya Parishad College of Engineerin; NIT Warangal

**4:40 PM Invited**

Improving Porous TC4/UHMWPE Friction Spot Welding Joint through Controlling Welding Temperature and Force: Muyang Jiang; Ke Chen; Binxi Chen; Min Wang; Lanting Zhang; Aidang Shari; Shanghai Jiao Tong University; Shanghai Jiao Tong University

**5:00 PM**

Production of AlSi12CuNiMg/Al203 Micro/Nanodispersed Surface Composites Using Friction Stir Processing for Automotive Applications: Lavinia Tonelli; Mohamed Refat; Stefania Toschi; Mohamed Ahmed; Essam Ahmed; Alessandro Morri; Iman El-Mahallawi; Lorella Ceschin; University of Bologna; British University in Egypt; Suez University; Cairo University
MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Deformation, Fracture and Fatigue

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Wednesday PM | March 13, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Irene Beyerlein, University of California, Santa Barbara; Lei Lu, Institute of Metal Research; Yunzhi Wang, Ohio State University; Shoichi Kikuchi, Shizouka University

2:00 PM Invited
Fatigue Crack Initiation and Propagation Behaviors in CP Titanium and Ti-6Al-4V Alloy with a Bimodal Harmonic Structure: Shoichi Kikuchi1, Yoshikazu Nakai2; Shizouka University; Kobe University

2:25 PM
Propagating Instabilities in Architectured Materials: Antoine-Emmanuel Viard1, Samuel Forest2; Justin Dirrenberger3; PIMM Arts et Métiers ParisTech; Mines ParisTech

2:45 PM
Localized Corrosion Behaviour and Surface Softening of AA7150 after Ultrasonic Shot Peening: Qingqing Sun1, Qingyou Han2; IMR CAS; Purdue University

3:05 PM
Low Temperature Deformation of Cu/Nb Nanolaminates: Rolf Schaarschuch1, Lutz Hollang1, Carl-Georg Oertel1, Irene Beyerlein1; Nathan Mara1; Werner Shrotzki1; TU Dresden; University of California, Santa Barbara; University of Minnesota

3:25 PM
Pre-tension Effect on Cyclic Response of Cu with Highly Oriented Nano-scale Twins: Qingsong Pan1; Haofei Zhou2, Huajian Gao2; Lei Lu3; Institute of Metal Research, Chinese Academy of Sciences; School of Engineering, Brown University

3:45 PM Break

4:05 PM Invited
Fracture Behavior of Metal-ceramic and Metal-metall Nanolaminates: Jon Molina-Aldaregutia;1 Imdea Materials Institute

4:30 PM
Transition from the Thickness-dependent to Thickness-independent Strength in the Nano-twinned Metals: Caiji Zhou; Xie Huang; Irene Beyerlein; Missouri University of Science and Technology; University of California, Santa Barbara

4:50 PM
Regulating Shear-dominant Displacive Processes by Nano-scale Concentration Modulations: Jiaming Zhu1, Dong Wang2; Yipeng Gao3; Tongyi Zhang4; Yunzhi Wang5; Hong Kong University of Science and Technology; Xian Jiao Tong University; Ohio State University

5:10 PM
Mechanical Interface Energies within Gradient Plasticity, Nanoindentation and Molecular Dynamics: Katerina Alfantis1, University of Florida

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Wednesday PM | March 13, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Hawk, National Energy Technology Laboratory; Haruyuki Inui, Kyoto University

2:00 PM Invited
Metastability Driven Hierarchical Microstructural Engineering: Overview of Strength-ductility Paradigms in Complex Concentrated Alloys: Rajiv Mishra1; S. Nene1; M. Frank1; M. Komarasmay1; S. Sinha1; K. Liu1; S. Shukla1; University of North Texas

2:20 PM Invited
Deformation Behavior of High Entropy Ceramics: Kenneth Vecchio1; Tyler Harrington1; Josh Gild2; Pranab Sarkar3; Cormac Toher1; Olivia Dippo1; Eduardo Marin1; Lucas Borowski1; Jian Luo2; Stefano Curtarolo2; Donald Brenner1; University of California, San Diego; Duke University; North Carolina State University

2:40 PM Invited
Small-scale Plastic Deformation of High Entropy Alloys: Mayur Pole1; Saideep Muskeri1; Yahid Hasannaime1; Sundeep Mukherjee1; University of North Texas

3:00 PM Invited
Single-crystal Mechanical Properties of Equiatomic CrMnFeCoNi High-entropy Alloy and Its Derivative Equiatomic Quaternary and Ternary Medium-entropy Alloys: Haruyuki Inui1; Easow George2; University of North Texas

3:30 PM
Enhancing Strength and Strain Hardenability via Deformation Twinning in Fcc-based High Entropy Alloys Reinforced with Intermetallic Compounds: Deep Choudhuri1; Bharat Gwalani1; Mageshwari Komarasamy1; Shripillathur Srinivasan1; Rajiv Mishra1; Rajarshi Banerjee1; University of North Texas

3:40 PM Break

4:00 PM Invited
Creep Performance of Single Phase FCC High Entropy Alloys: Kyle Roxman1; Martin Detris1; Paul Jablonski1; Michael Gao1; Jeffrey Hawk1; National Energy Technology Laboratory

4:20 PM Invited
Neutron Scattering Mapping to Investigate the Fatigue-crack Propagation in an Equiatomic CoCrFeMnNi High-entropy Alloy: Bo-Hong Lai1; Rui Feng1; Soo Yeol Lee1; Yao-Jen Chang2; Stefanus Harjo1; Yuan-Wei Chang1; Yu-Lih Huang1; Chu-Chun Kao1; Hung-Sheng Chou1; Liaw Peter1; An-Chou Yeh1; E-Wen Huang1; National Chiao Tung University; University of Tennessee; Chungnam National University; National Tsing Hua University; J-PARC Center, Japan Atomic Energy Agency

4:40 PM
On the Nature of Plastic Flow in CoCrFeMnNi Alloy under high-velocity Shear Deformation: Shwetabh Yadav1; Andrew Kustas2; Nicolas Argibay1; Dinhak Sagapuran1; Texas A&M University; Sandia National Laboratories
2:00 PM Invited
Radiation Effects in High Entropy Alloys: Similarities and Differences with Conventional Alloys: Steven Zinkle\textsuperscript{1}; Tengfei Yang\textsuperscript{1}; Congyi Li\textsuperscript{1}; University of Tennessee

2:20 PM
Phase Stability and Solid Solution Strengthening in Fcc High-entropy Alloys Investigated by a Diffusion Couple Approach: Karsten Durst\textsuperscript{1}; Enrico Bruder\textsuperscript{1}; Tom Keil\textsuperscript{1}; TU Darmstadt

2:40 PM
Diffusion in Fcc AlCoCrFeNi High Entropy Alloys: Abhishek Mehta\textsuperscript{1}; Le Zhou\textsuperscript{1}; Yongho Sohn\textsuperscript{1}; University of Central Florida

3:00 PM Invited
Transformation Induced Softening and Plasticity in High Entropy Alloys: Jia Li\textsuperscript{1}; Qihong Fang\textsuperscript{1}; Bin Liu\textsuperscript{1}; Yong Liu\textsuperscript{1}; State Key Laboratory of Advanced Design and Manufacturing for Vehicle Body, Hunan University; State Key Laboratory of Powder Metallurgy, Central South University

3:20 PM Invited
High-entropy Metal Diborides and Fluorite/Pervoskite Oxides: Jian Luo\textsuperscript{1}; Joshua Gild\textsuperscript{1}; Tyler Harrington\textsuperscript{1}; Sicong Jiang\textsuperscript{1}; Kenneth Vecchio\textsuperscript{1}; Cormac Toher\textsuperscript{1}; Pranab Sarker\textsuperscript{1}; Stefano Curtarolo\textsuperscript{1}; Jeffrey Braun\textsuperscript{1}; Lavina Backman\textsuperscript{1}; Patrick Hopkins\textsuperscript{1}; Elizabeth Opila\textsuperscript{1}; Samuel Daigle\textsuperscript{1}; Donald Brenner\textsuperscript{1}; Jon-Paul Maria\textsuperscript{1}; University of California, San Diego; Duke University; University of Virginia; North Carolina State University; Pennsylvania State University

3:40 PM Break

4:00 PM
Phase Transformations of HfNbTaTiZr High Entropy Alloy at Intermediate Temperature: Shuying Chen\textsuperscript{1}; Peter K Liaw\textsuperscript{1}; Jien-Wei Yeh\textsuperscript{1}; University of Tennessee; National Tsing Hua University

4:20 PM
Phase Formation and Magnetic Properties of FeMnCoCrAl Based High Entropy Alloy Thin Films: Marshal Alman\textsuperscript{1}; RWTH Aachen University

4:40 PM
Investigation of Interdiffusion in High Entropy Alloys: Mohammad Afkuzu\textsuperscript{1}; Irina Belova\textsuperscript{1}; Graeme Murch\textsuperscript{1}; University of Newcastle

5:00 PM
Radiation Resistant High Entropy Alloys for Fast Reactor Cladding Applications: Anna Kareer\textsuperscript{1}; David Armstrong\textsuperscript{1}; Angus Wilkinson\textsuperscript{1}; University of Oxford
**CHARACTERIZATION**

Interfacess in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Mechanical Behavior II: A Joint Session with Mechanical Behavior Related to Interfacial Physics III

*Sponsored by:* The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

*Program Organizers:* Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

**Wednesday PM | March 13, 2019**

**302C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Richard LeSar, Iowa State University; Anthony Rollett, Carnegie Mellon University

2:00 PM Invited

Mesoscopic Studies of Dislocation Interactions with Biphas Interfaces

Irene Beyerlein<sup>1</sup>; Shuozhi Xu<sup>1</sup>; Abigail Hunter<sup>2</sup>; University of California Santa Barbara; Los Alamos National Laboratory

2:30 PM

Molecular Dynamics: Saryu Fensin<sup>1</sup>; Timothy Frolov<sup>2</sup>; Los Alamos National Laboratory

2:50 PM Invited

Effect of Grain Boundary Structure on its Dynamic Response Using Molecular Dynamics: Saryu Fensin<sup>1</sup>; Timothy Frolov<sup>2</sup>; Los Alamos National Laboratory

3:20 PM Invited

Tailoring Mechanical Behavior with One- and Two-dimensional Complexes: Timothy Rupert<sup>1</sup>; University of California Irvine

3:50 PM Break

4:10 PM

Deformation Mechanisms in Nanocrystalline Pt-Au: Competition of Grain Boundary Embrittlement and Compositional Crack Arrest: Nathan Heckman<sup>1</sup>; Stephen Foiles<sup>1</sup>; Christopher O'Brien<sup>1</sup>; Michael Chandross<sup>1</sup>; Christopher Ban<sup>1</sup>; Nicolas Argibay<sup>1</sup>; Khalid Hattar<sup>1</sup>; Ping Lu<sup>1</sup>; David Adams<sup>1</sup>; Brad Boyce<sup>1</sup>; Sandia National Laboratories

4:30 PM

Effect of a Vertical Twin Boundary on the Mechanical Property of Bicrystalline Copper Micropillars: DeAn Wei<sup>1</sup>; Haidong Fan<sup>2</sup>; Jing Tang<sup>1</sup>; Xu Zhang<sup>1</sup>; Southwest Jiaotong University; Sichuan University

4:50 PM

Atomic Structure of Gamma/Alpha2 Interface and its Influence on Plastic Deformation of Lamellar TiAl Alloys: Aidong Tu<sup>1</sup>; Chunyu Tang<sup>1</sup>; Hao Wang<sup>1</sup>; Dongsheng Xu<sup>1</sup>; Yun Fu<sup>1</sup>; Zhanyong Ren<sup>1</sup>; Rui Yang<sup>1</sup>; Chinese Academy of Sciences; AVIC China Aero-Polytechnology Establishment

**LIGHT METALS**

Magnesium Technology 2019 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, Texture and Fatigue I

*Sponsored by:* TMS Light Metals Division, TMS: Magnesium Committee

*Program Organizers:* Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

**Wednesday PM | March 13, 2019**

**005 | Henry B. Gonzalez Convention Center**

**Session Chairs:** Sean Agnew, University of Virginia; Petra Maier, Stralsund University of Applied Sciences

2:00 PM Invited

Evolution of the Intermetallic Particle Distribution in Thixomolded Magnesium Alloys: Benjamin Anthony<sup>1</sup>; Brady Dowdell<sup>2</sup>; Victoria Miller<sup>2</sup>; North Carolina State University

2:30 PM Invited

Revealing the Role of Combined Loading on the Tension-compression Assymetry in a Textured AZ31 Magnesium Alloy: Chaitanya Kale<sup>1</sup>; Kiran Solanki<sup>2</sup>; Arizona State University

3:00 PM

An Investigation of Detwinning Behavior of In-plane Compressed E-form Mg Alloy during the In Situ Tensile Test: Jaiveer Singh<sup>1</sup>; Min-Seong Kim<sup>2</sup>; Seong-Eum Lee<sup>2</sup>; Joo-Hee Kang<sup>1</sup>; Shi-Hoon Choi<sup>1</sup>; Sunchon National University; Korea Institute of Materials Science

3:20 PM

Characterization of Staggered Twin Formation in HCP Magnesium: M Arul Kumar<sup>1</sup>; Brandon Leu<sup>1</sup>; Paul Rottmann<sup>2</sup>; Luoning Ma<sup>1</sup>; Irene Beyerlein<sup>1</sup>; Los Alamos National Laboratory; University of California Santa Barbara; Johns Hopkins University

3:40 PM Break

4:00 PM

Dislocation Behavior and Grain Boundary Segregation of Mg-Zn Alloys: Hye-Sun Jang<sup>1</sup>; Byeong-Joo Lee<sup>2</sup>; Pohang University of Science and Technology (POSTECH)

4:20 PM

Effect of Hot Working on the High Cycle Fatigue Behavior of WE43 Rare Earth Magnesium Alloy: Saeede Ghorbanpour<sup>1</sup>; Brandon McWilliams<sup>2</sup>; Marko Knezevic<sup>1</sup>; Department of Mechanical Engineering, University of New Hampshire; Weapons and Materials Research Directorate, US Army Research Laboratory

4:40 PM

Effect of Solute Atoms on the Twinning Deformation in Magnesium Alloys: Jing Tang<sup>1</sup>; Wentao Jiang<sup>2</sup>; Xiaobao Tian<sup>1</sup>; Haidong Fan<sup>2</sup>; Sichuan University

5:00 PM

First-principles Investigation of the Effects of Solute on the Ideal Shear Resistance and Electronic Properties of Magnesium: Pulhlt Garg<sup>1</sup>; Ilaksh Adlakha<sup>2</sup>; Kiran Solanki<sup>2</sup>; Arizona State University; Indian Institute of Technology, Madras

5:20 PM

Inverse Optimization to Design Processing Paths to Tailor Formability of Mg Alloys: Wahaz Nasim<sup>1</sup>; Joshua Herrington<sup>1</sup>; Amine Benzerga<sup>1</sup>; Jyhwen Wang<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Texas A&M University
NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Microstructure Effects II

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Wednesday PM | March 13, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Eda Aydogan, Los Alamos National Laboratory; Xian-Ming Bai, Virginia Polytechnic Institute

2:00 PM Invited
Mechanical Property Changes in Ni-based Alloys with Long Range Order Formation: Julie Tucker; Fei Teng; Nicholas Aerne; Li-Jen Yu; Emmanuelle Marquis; Hi Vo; Peter Hosemann; 2Oregon State University; 2University of Michigan-Ann Arbor; 2University of California-Berkeley

2:30 PM
Deformation Behavior and Microstructural Evolution of Depleted Uranium - 10 wt% Molybdenum: Cody Miller; Rodney McCabe; Daniel Coughlin; 1Los Alamos National Laboratory

2:50 PM Invited
Amorphous Intergranular Films for Improved Performance Under Irradiation: Timothy Rupert; Jennifer Schuler; Brad Boyce; Khalid Hattar; 1University of California Irvine; 1Sandia National Laboratories

3:20 PM
Directional Dependence of Irradiated Damage in W: Byeongchan Lee; Youhwan Jo; Kyung Hee University

3:40 PM Break

4:00 PM
Mechanical and Structural Transformation of Tungsten Implanted with He Ions: Mehdi Balooch; Frances Allen; David Frazer; Peter Hosemann; 1University of California, Berkeley

4:20 PM
In-situ Observations of the Role of Stress-state on Strain to Failure of Non-hydrided and Hydrided Zircalloy-4: Brian Cockeram; Kwai Chan; Bruce Kammenzind; 1Nnl Bettis Laboratory; 1Southwest Research Institute

4:40 PM
A New RPV High Fluence Low Flux RPV Embrittlement Model for the International Surveillance Database: Takuya Yamamoto; Peter Wells; Nathan Almirall; G. Robert Odette; 1University of California Santa Barbara

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Metamaterials-MOFs-nano Architecture

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Wednesday PM | March 13, 2019
214A | Henry B. Gonzalez Convention Center

Session Chair: Christoph Eberl, Fraunhofer IWM

2:00 PM Invited
Tunable and Multi-functional 3D Printed Mechanical Metamaterials: Kathryn Matlack; Ignacio Aretche; Connor Pierce; Chaitanya Nimmagadda; 1University of Illinois at Urbana-Champaign

2:30 PM Invited
Three-dimensional (3D) Nano-architected Meta-materials: Julia Greer; Andrey Vyatskikh; Carlos Portela; Xiaoxing Xia; Kai Narita; 1California Institute of Technology

3:00 PM
Programmable Mechanical Metamaterials by Structural Hierarchy: Matthew Berwind; Chris Eberl; 1Fraunhofer Society

3:20 PM Break

3:50 PM
Laser Ablation Synthesis in Solution (LASiS) as a Facile Strategy for the Synthesis of Metal Organic Frameworks (MOFs) with Tunable Size and Morphology: Erick Ribeiro; Seyed Ali Davari; Sheng Hu; Dibyendu Mukherjee; Bamin Khomami; 1University of Tennessee, Knoxville

4:10 PM Invited
New Nanoarchitected Materials via Liquid Metal Dealloying: Jonah Eriebacher; Bernard Gaskey; Alyssa Chuang; Gina Greenidge; 1Johns Hopkins University

4:40 PM
Towards Digitally Controlled Hierarchical Nanoporous Architectures: Juergen Biener; 1Lawrence Livermore National Laboratory

5:00 PM
Processing of Novel Pseudomorphic Cu-Mo Hierarchies in Thin Film Nanoarchitectures: Benjamin Derby; Yuchi Cui; Jon Baldwin; Raymundo Arroyave; Michael Demkowicz; Amit Misra; 1University of Michigan; 1Los Alamos National Laboratory; 1Texas A&M University
Physically Metallurgy

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys III

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharya, ANSTO; Rajarshi Banerjee, University of North Texas

Wednesday PM | March 13, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Dhriti Bhattacharya, Australian Nuclear Science and Technology Organization; Alexander Zhilyaev, Nosov Magitogorsk State Technical University

2:00 PM
In Situ and Time-resolved Diffraction Studies to Track Metals under Phase Transformations and Microstructural Evolution: Klaus-Dieter Liss1; 1Guangdong Technion – Israel Institute of Technology

2:20 PM
Microstructure Evolution and Mechanical Properties of Heavily Cold-rolled and Subsequently Heat-treated Cu-3wt.%Ti with Nano-lamellar Structure: Kenji Koike1; Kester Clarke2; Amy Clarke3; Colorado School of Mines

2:40 PM
Microstructure Evolution in Large-grained, Fully-solutionized Mg-9Al (wt%) Alloy during Uniaxial Compression at Elevated Temperatures: Sukhaeswarappa Prameela1; Steven Lavenstein1; Roshan Plamthottam1; Jaafar El-Awady1; Laszlo Kecskes1; Tomoko Sano2; Timothy Weihs2; Johns Hopkins University; 4MatSys; 5U.S. Army Research Laboratory

3:00 PM
Phase Microstructure Evolution Observed by Local Magnetic Force Microscopy in (Mn,Fe),(P, Si): Timothy Brown1; Patrick Shamberger2; 1Texas A&M University

3:20 PM
Shape Memory Behavior of Ni49.5Ti50.5 Processing-Induced Strain Glass Alloys: Robert Wheeler1; Jesse Smith1; Nathan Ley2; Anit Gir2; Marcus Young1; 1University of North Texas; 2U.S. Army Research Laboratory

3:40 PM Break

4:00 PM
Age-hardening of AlMg Alloys with Additions of Zn and Cu: Lukas Stumper1; Bernhard Mitas1; Thomas Kremmer1; Steffen Otterbach1; Peter Uggowitzer1; Stefan Bogatscher1; 1Montanuniversität Leoben; 2Audi AG; 3ETH Zürich

4:20 PM
Shape Memory Properties of NiTi-based Nanoparticles Fabricated by Phase-separation and Dealloying: Ji Young Kim1; So Yeon Kim2; Sang Jun Kim2; Wook ha Ryu2; Eun Soo Park2; 1Seoul National University; 2Tohoku University

4:40 PM
Phase Transformations of Ti-Nb-Zr-O Biomedical Alloy Prepared by Spark Plasma Sintering: Jiri Kozlik1; Josef Strásky2; Tomas Chraska1; Milos Janecek1; 1Charles University; 2Czech Academy of Science

5:00 PM
Phase Transformations in Metastable \(\beta\)46-Ti alloys: Petr Harcuba1; Jana Smilauerova1; Pavel Zhanal1; 1Charles University in Prague

Nanostuctured and Heterostructured Materials

Powder Processing of Bulk Nanostructured Materials — Nanocomposites

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Wednesday PM | March 13, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Dor Amram, Massachusetts Institute of Technology

2:00 PM
Synthesis of Bulk Metal Matrix Nanocomposites Reinforced by Nanodiamonds: Andrea Bachmaier1; Andreas Katzensteiner1; Reinhard Pippan3; 2Erich Schmid Institute, Austrian Academy of Sciences

2:20 PM
Designing C/CNT-coated Ti-6Al-4V Powders for High-performance Nano-sized TiC and CNT Synergistically Reinforced Ti-6Al-4V Composites: Yafeng Yang1; Shaofu Li3; 1Institute of Processing Engineering Chinese Academy of Science

2:40 PM
Carbon Nanotube Coated Conductors: Terry Holesinger1; Pouria Khanbolouki1; Mehran Tehrani1; 1Los Alamos National Laboratory; 2University of New Mexico

3:00 PM
Multi-scale Mechanical Properties of a Titania-Boron Nitride Nanotube (BNNT) Composite Synthesized by Spark Plasma Sintering: Jennifer Bustillos1; Pranjal Nautiyal2; Cheng Zhang1; Benjamin Boesl1; Arvind Agarwal1; 1Florida International University

3:20 PM Break

3:40 PM
A Cationic-specie-hybridized Micro-scale Framework of Copper Phthalocyanine: Jia-Lin Hsu1; Kai-Wei Liu2; 1Texas A&M Transportation Institute

4:00 PM
Reactive Spark Plasma Sintering of BCN Phase from 2D Graphene – Boron Nitride Nanosheets: Microstructural Evolution and Tribological Properties: Archana Loganathan1; Amit Sharma1; Pranjal Nautiyal2; Satyam Suwas2; Benjamin Boesl1; Arvind Agarwal1; 1Florida International University; 2Indian Institute of Science

4:20 PM
Microstructure of \(\beta\)-FeSi2 – Si1-x Ge x Thermoelectric Nanocomposites by React/Transform Spark Plasma Sintering: Naiming Liu1; Wade Jensen1; Mona Zebjarjadi1; Jerold Floro1; 1University of Virginia
ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics I: Functional Materials and Devices

**Sponsored by:** TMS: Thin Films and Interfaces Committee

**Program Organizers:** Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierrros, West Virginia University; Wenchao Zhou, University of Arkansas

**Wednesday PM | March 13, 2019**

**217D | Henry B. Gonzalez Convention Center**

**Session Chairs:** Konstantinos Sierrros, West Virginia University; Megan Cordill, Erich Schmid Institute for Materials Science

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**2:00 PM Invited**

Develop Solution-based, Direct-printing Processes of Inorganic Semiconductors for Electronics and Energy Applications: Chih-hung Chang\(^1\); Rajiv Malhotra\(^2\); Kostas Sierrros\(^3\); Oregon State University; \(^2\)Rutgers University; \(^3\)West Virginia University

**3:20 PM Invited**

Highly Conductive Wiring and Reliable Bonding for Stretchable Electronics: Cai-Fu Li\(^2\); Hao Zhang\(^2\); Wanti Li\(^2\); Tohru Sugahara\(^2\); Zhi-Quan Liu\(^2\); Katsuaki Sugenuma\(^2\); Osaka University; \(^2\)Institute of Metal Research, Chines Academy of Sciences

**3:00 PM Invited**

Ink Design for Continuous Direct Writing: Controlling Complex Metal-Oxide Mesosstructures: Maria Torres Arango\(^1\); Konstantinos Sierrros\(^2\); Brookhaven National Laboratory; \(^2\)West Virginia University

**3:30 PM Break**

**3:50 PM Invited**

3D Printing of Pharmaceuticals and Transdermal Drug Delivery — An Overview: David Bird\(^1\); Emel Eker\(^2\); Nuggehalli Ravindra\(^3\); US Army ARDEC; \(^2\)Secaucus High School; \(^3\)New Jersey Institute of Technology

**4:20 PM**

Formulation of Curable Resins Utilized in Stereolithography: David Bird\(^1\); Elbert Caravaca\(^2\); Joseph Lquidara\(^2\); Keith Luhmann\(^2\); Nuggghalli Ravindra\(^3\); US Army ARDEC; \(^2\)New Jersey Institute of Technology

**4:40 PM Invited**

Dissolvable Tattoo Sensors from Advanced Manufacturing and Materials: Huanyu Cheng\(^1\); Pennsylvania State University

**5:10 PM**

Surface Force-driven Direct Ink Writing of Titanium Dioxide Thin Films for Photovoltaics: Guy Cordonier\(^1\); Josepsh Bright\(^2\); Nianjiang Wu\(^2\); Konstantinos Sierrros\(^3\); West Virginia University

**5:30 PM**

A “Press and Go” Fabrication Technique for a Flexible Biofuel Cell Patch for Power Generation and Glucose Sensing: Biao Leng\(^2\); Nuggghalli Ravindra\(^3\); Zafar Iqbal\(^3\); New Jersey Institute of Technology

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BIO MATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings I

**Sponsored by:** TMS: Thin Films and Interfaces Committee

**Program Organizers:** Adele Carrado, IPCMS - CNRS; Nancy Michael, University of Texas, Arlington; Gerald Ferblantier, Icube Laboratory; Heinz Palkowski, Clausthal University of Technology; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Vikas Tomar, Purdue University

**Wednesday PM | March 13, 2019**

**217A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Nuggghalli M Ravindra, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

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**2:00 PM Keynote**

Recent Developments in Hafnia-based Thin Film Memristors: Ashfaq Adnan\(^1\); Adrian Martinez\(^1\); \(^1\)University of Texas, Arlington

**2:35 PM Invited**

3D Printed Metal Films: Md. Taibur Rahman\(^2\); Rahul Panait\(^2\); Chintalapalle V. Ramana\(^2\); Carnegie Mellon University; \(^2\)University of Texas, El Paso

**3:05 PM**

Characterization of Self-lubricating Coatings Deposited by Plasma Enhanced Magnetron Sputtering: Forest Thompson\(^1\); Frank Kustas\(^2\); Kent Coulter\(^2\); Grant Crawford\(^2\); South Dakota School of Mines and Technology; \(^2\)NanoCoatings, Inc.; \(^2\)Southwest Research Institute

**3:25 PM Break**

**3:45 PM Keynote**

Control of Friction and Adhesion at Nanoscale: How Surface Heterogeneities can Affect Interfacial Forces?: Karine Mougin\(^1\); \(^1\)Institut De Science Des Matériaux De Mulhouse

**4:20 PM Invited**

Friction Conditions on Deep Drawing Tool Radii When Using Volatile Media as Lubrication Substitute: Gerd Reichardt\(^1\); Mathias Liewald\(^1\); \(^1\)University of Stuttgart

**4:45 PM Invited**

Investigation of Friction and Adhesion Behavior of Textured Workpieces and Coated Tools under Dry Tribological Contact: T. Bergs\(^1\); P. Mattfeld\(^1\); D. Trauth\(^1\); R. Mannens\(^1\); K. Bobzin\(^1\); Rafael Hild\(^1\); OT RWTH Aachen

**5:10 PM**

Effects of Emissivity on Combustion Behavior of Energetic Materials: Elbert Caravaca\(^1\); David Bird\(^2\); Henry Grau\(^1\); Viral Panchali; Nuggghalli Ravindra\(^3\); US Army ARDEC; \(^3\)New Jersey Institute of Technology
ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Circularity and Materials Availability

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, INL LLC; Elsa Olivetti, Massachusetts Institute of Technology

Wednesday PM | March 13, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: Gabrielle Gaustad, Alfred University

2:00 PM
Circular Cities, E-mobility and the Metals Industry — A World in Transition: Christina Meskers; Mark Caffrey; Maurits Van Camp; Umicore

2:20 PM
The Role of Scrap Recycling in the USA, for the Circular Economy: A Case Study of Copper Scrap Recycling: Phillip Mackey; Nubia Cardona Valencia; Mackey Technologies; Deltamet Consultants

2:40 PM
Comparing Secondary and Byproduct Sources of Rare Earth Metals: Gabrielle Gaustad; Alexandra Leader; Eric Williams; Saptarshi Das; Alfred University; Rochester Institute of Technology

3:00 PM
Cobalt Criticality and Availability in the Wake of Increased Electric Vehicle Demand: A Short-term Scenario Analysis: Danielle Beatty; Xin Kai Fu; Michele Bustamante; Gabrielle Gaustad; Callie Babbitt; Randolph Kirchain; Richard Roth; Elsa Olivetti; University of Utah; Massachusetts Institute of Technology; Alfred University; Rochester Institute of Technology

3:20 PM Break

3:40 PM
Mining Value from Waste Initiative: Towards a Low Carbon and Circular Economy: Janice Zinchi; Bryan Tisch; Natural Resources Canada

4:00 PM
Exploring Drivers of Copper Supply and Demand Using a Dynamic Market Simulation: Jingshu Zhang; Omar Swei; Richard Roth; Randolph Kirchain; Massachusetts Institute of Technology; University of British Columbia

4:20 PM
Towards a Solid Waste Economy in Colombia: An Analysis with Respect to Other Leading Economies and Latin America: Julian Rúa-Restrepo; Gloria Echeverri; Henry Colorado; Universidad Autónoma Latinoamericana Unalua

LIGHT METALS

Scandium Extraction and Use in Aluminum Alloys — Aluminum Scandium Alloys

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizers: Nigel Ricketts, Altrius Engineering Services; John Grandfield, Grandfield Technology Pty Ltd

Wednesday PM | March 13, 2019
006D | Henry B. Gonzalez Convention Center

Session Chair: Timothy Langan, Clean TeQ

2:00 PM Introductory Comments

2:05 PM
Grain Refinement of Al4CuTi based Alloy with Zr, Sc, Er and TiB2: Jiehua Li; Peter Schumacher; Montanuniversität Leoben

2:30 PM
Optimised Composition and Process Design to Develop Sc-enhanced Wrought Al-Si Alloys: Jayshri Dumbre; Timothy Langan; Thomas Dorin; Nick Birbilis; Monash University; Clean TeQ Ltd; Deakin University

2:55 PM
Developments in Aluminum-scandium-ceramic and Aluminum-Scandium-Cerium Alloys: David Weiss; ECK Industries Inc.

3:20 PM Break

3:35 PM
Developing an Optimised Homogenisation Process for Sc and Zr Containing Al-Mg-Si Alloys: Steven Babaniaris; Mahnedra Ramajayam; Lu Jiang; Timothy Langan; Thomas Dorin; Deakin University - Institute for Frontier Materials; Clean TeQ Ltd

4:00 PM
Effect of Scandium on Wire Arc Additive Manufacturing of 5 Series Aluminum Alloys: Andrew Sales; Nigel Ricketts; AML Technologies; Altrius Engineering Services

4:25 PM
Heat Treatments for Precipitation of Scandium-containing Dispersoids in Si-containing Aluminum Alloys: Timothy Langan; Avishan Shomali; Pinaki Mukherjee; Thomas Wood; Paul Sanders; Clean TeQ; Michigan Technological University; Michigan Technological University

4:50 PM
Effect of Mg Content on Al3Sc-dispersoid Formation in Cast Billets of Al-Mg-Sc Alloys: Paul Sanders; Tom Wood; Carson Williams; Tim Langan; Michigan Technological University; Clean TeQ Holdings Limited
2:00 PM Invited
Advocating the Vital Importance of Support for Materials Research and Engineering Education in our Representative Democracy: Iver Anderson1; 1Iowa State University, Ames Laboratory

2:30 PM Invited
How Science Policy Really Gets Done in Congress: Scott Lititzman; 2TMS-MRS Congressional Science and Engineering Fellow

3:00 PM Invited
From the Lab to The Hill: How to Get a Job in Policy and What You’ll Do When You Get There: Edward Herderich; 1Ohio State University

3:30 PM Break

3:50 PM Panel Discussion: The panelist include Iver E. Anderson, Iowa State University/Ames Laboratory; Edward D. Herderick, Ohio State University; and John Allison, University of Michigan.

4:55 PM Concluding Comments

SPECIAL TOPICS
Science Policy within the Materials Research Community — Getting Involved in Science Policy

Sponsored by: TMS: Education Committee

Program Organizers: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

Wednesday PM | March 13, 2019
008B | Henry B. Gonzalez Convention Center

Session Chairs: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

Sponsored by: TMS: Education Committee

Program Organizers: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

Wednesday PM | March 13, 2019
008B | Henry B. Gonzalez Convention Center

Session Chairs: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

ELECTRONIC MATERIALS

Solar Cell Silicon — Properties, Impurities, and Refining

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

Wednesday PM | March 13, 2019
008A | Henry B. Gonzalez Convention Center

Session Chair: Shadia Ikhmayies, Al Isra University

2:00 PM Introductory Comments

2:05 PM
The Influence of Boron Dopant on the Structural and Mechanical Properties of Silicon: First Principles Study: Shadia Ikhmayies1; Yasemin Çiftci2; 1Al Isra University; 2Gazi University

2:25 PM
The Influence of Phosphorus Dopant on the Structural and Mechanical Properties of Silicon: Shadia Ikhmayies1; Yasemin Çiftci2; 1Al Isra University; 2Gazi University

2:45 PM
Simple and High-effective Purification of Metallurgical Grade Silicon through Metal Assisted Chemical Leaching: Fengshuo Xi1; Shaoyuan Li1; Wenhu Ma2; Kuixian Wei2; Jijun Wu3; Kqiang Xie1; Yun Lei1; Zhengjie Chen1; Jie Yu1; Xiaohan Wan1; Bo Qin1; 1Kunming University of Science and Technology

3:05 PM
Boron Removal from Molten Silicon by Ammonia Gas Blowing: Xuanyi He1; Zhiyuan Chen2; Kazuki Morita1; 1University of Tokyo

3:25 PM
Slag Refining of Ferrosilicon Alloys using SiO2-Al2O3-CaO Ternary System: Ozair Rajani1; Leili Tafaghodi1; Ali Hosseinpour1; 1University of British Columbia

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Titanium Alloys and Research Partnerships

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Wednesday PM | March 13, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Matthew Dargusch, University of Queensland; John Grandfield, Grandfield Technology Pty Ltd

2:00 PM Invited
A History of the Global Light Metals Alliance: Jennifer Jackman1; Kumar Sadayappan1; Mark Easton2; 1CanmetMATERIALS; 2RMIT University

2:20 PM Invited
Capability Through Collaboration: The Defence Materials Technology Centre: Matthew Dargusch1; 1University of Queensland

2:40 PM Invited
The CAST Cooperative Research Centre: Lessons for Research Collaboration: John Grandfield1; Mark Easton2; 1Grandfield Technology Pty Ltd; 2RMIT University

3:00 PM
Developing Sustainable Metallic Materials through Industry and Research Collaboration: Zhongyun Fan1; 1Brunel University

3:20 PM Break

3:40 PM Keynote
Identifying and Understanding the Influence of Columnar Beta-phase Boundaries on the Tensile and Fatigue Properties of Additively Manufactured Ti-6Al-4V Alloy: Ma Qian1; Huiping Tang; Jian Wang2; 1RMIT University (Royal Melbourne Institute of Technology); 2Northwest Institute for Non-ferrous Metal Research

4:00 PM
Composition Optimization and Solidification Behavior of Cast High Temperature Titanium Alloy: Hongchao Kou1; Tingting Huang2; Fengming Qiang3; Zhigang Sun4; 1Northwestern Polytechnical University

4:20 PM
R & D of New Titanium Alloys In China: Yongqing Zhao1; 1Northwest Institute for Nonferrous Metal Research
4:40 PM  Invited
Selective Laser Melting: Case Studies in Aluminium and Titanium Alloys: Peng Cao; Ruidi Li; Tiecui Yuan; 1The University of Auckland; 2Central South University

5:00 PM  High Strength Ti-6Al-4V Composites by In Situ Generated Stable Nanoparticles: Soumya Vinod; Babaraj Eranezhuth; Lavene Smith; Jun Guan; Viktor Hadjiev; Kenneth White; James Meen; 1Clarkson Aerospace Corporation; 2University of Houston

5:20 PM  Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session VI

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Wednesday PM | March 13, 2019
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Session Chairs: Dongchan Jang, KAIST; Robert Wheeler, Microtesting Solutions LLC

2:00 PM  Keynote
Use of Raman Spectroscopy to Study Plastic Deformation in Silicate Glasses: Shefford Baker; Nicole Wiles; Zachary Rouse; Sanjit Bhowmick; Praveena Manimunda; Thomas Wyrobek; S.A. Syed Asif; 1Cornell University; 2Bruker Nano Surfaces

2:40 PM  Combining Raman Spectroscopy and Nanoindentation to Probe Temperature and Pressure Induced Structural Changes: Praveena Manimunda; Eric Hintsala; Douglas Stauffer; Sanjit Bhowmick; Syed Asif; 1Bruker Nano Surfaces

3:00 PM  Mechanical Properties of Mg-LPSO Alloys during Hot Deformation: Daria Drozdenko; Kristian Mathis; Michiaki Yamashiki; Yoshihito Kawamura; 1Kumamoto University; 2Charles University

3:20 PM  Monitoring Fabrication and Operation of Ceramic Materials by the Acoustic Emission Technique: Frantisek Chmelik; Michal Knapek; Patrik Dobron; Stefan Csáki; Peter Minárík; 1Charles University

3:40 PM  Curling in Bi-component Applications: Akantska Garg; Yinglong Chen; Pavan Valavala; Fabricio Arteaga Larios; Jill Martin; 1The Dow Chemical Company

4:00 PM  Break

4:20 PM  Thermo-mechanical Damage Evolution of Energetic Materials in Elevated Temperature Environments: Judith Brown; William Erikson; Marcia Cooper; Shuyue Guo; Scott Roberts; Dan Bolintineanu; 1Sandia National Laboratories

4:40 PM  In Situ Studies of a Micron-scale Impact-induced Thermo-mechanical Failure: Mostafa Hassan-Gangaraj; David Veysset; Keith Nelson; Christopher Schuh; 1Massachusetts Institute of Technology

5:00 PM  In-situ Investigation of Thermo-mechanical Properties of a Free-standing Boron Nitride Nanotube Buckypaper: Pranjal Nautiyal; Cheng Zhang; Benjamin Boesl; Arvind Agarwal; 1Florida International University

LIGHT METALS

Ultrasonic Processing of Liquid and Solidifying Alloys — Mechanisms and Applications of Ultrasonic Processing

Sponsored by: TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS: Aluminum Committee; TMS: Process Technology and Modeling Committee

Program Organizers: Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Koulis Pericleous, University of Greenwich; Iakovos Tzanakis, Oxford Brookes University

Wednesday PM | March 13, 2019
006B | Henry B. Gonzalez Convention Center

Session Chairs: Laurentiu Nastac, University of Alabama; Iakovos Tzanakis, Oxford Brookes University

2:00 PM  Introductory Comments

2:05 PM  Invited
Development and Application of Large-sized Sonotrode Systems for Ultrasonic Treatment of Molten Aluminum Alloys: Sergey Komarov; Takuya Yamamoto; 1Tohoku University

2:30 PM  Altering the Microstructure Morphology by Ultrasound Melt Processing during 6XXX Aluminium DC-Casting: Georges Saloum-Abou-Jaoude; Dmitry Eskin; G.S.B. Lebon; Carla Barbatti; Philippe Jarry; 1Martin Jarrett; 2Constellium; 3Brunel University London

2:50 PM  Effect of Acoustic Streaming on Degassing Level of A356 Al Alloy by Ultrasonic Melt Treatment: Jeong-il Youn; Young Ki Lee; Young Jig Kim; Ja Uk Koo; 1Sungkyunkwan University; 2DR AXION

3:10 PM  Invited
Cellular Automation Finite Element Modeling of the Evolution of the As-cast Microstructure of an Ultrasonically Treated Al-2Cu Alloy: Gui Wang; Paul Croaker; Matthew Dargusch; Damian McGuckin; David StJohn; 1The University of Queensland; 2University of New South Wales; 3Pacific Engineering Systems International

3:35 PM  Break

4:05 PM  In Situ Detection of Non-metallic Inclusions in Aluminum Melt (1xxx) - Comparison Between a Newly Developed Ultrasonic Technique and LIMCA and PoDFA Method: Friederike Feiliks; Florian Funken; Thomas Waschkies; Andreas Buehrig-Polaczek; 1Foundry Institute RWTH Aachen University; 2Fraunhofer Institute for Nondestructive Testing (IZFP)

4:25 PM  Crystallization Behavior of Iron-containing Intermetallic Compounds in Al-Si Alloy under Ultrasonic Treatment: Yubo Zhang; Tongmin Wang; Tingju Li; 1Dalian University of Technology
4:45 PM
Microstructure and Mechanical Properties of Dispersion-strengthened Aluminum-magnesium Alloys Obtained Using Ultrasonic Treatment of Melt: Alexander Vorozhtsov1; Anton Khrustalev1; Ilya Zhukov1; Alexander Kozulin1; Evgeny Alifirenko2; 1Tomsk State University; 2The Federal State Unitary Enterprise “Central Research Institute of Structural Materials “Prometey” Named by I.V. Gorynin of National Research Center “Kurchatov Institute”

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Preparation of Alloys and Materials I

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinkilic, Atılım University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Thursday AM | March 14, 2019
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Session Chairs: Jerry Downey, Montana Tech of The University of Montana; Chenguang Bai, Chongqing University

8:30 AM
Effects of Electrolytic Parameters on the Preparation of Al-Sc Master Alloy in Na2AlF6-K2AlF7-AlF3 Melt: Kai Yang1; Zhongjiang Tian1; Xun Hu1; Yanqing Lai1; Jie Li1; 1Central South University

8:50 AM
Investigation of the Effect of Tri-nano Additives on Wear Rate and Hardness of AISI 5130 Steel during Machining: Adeniran Afolalu1; 1Covenant University

9:10 AM
Numerical Simulation Study on the Position Layout of the Permeable Brick at the Bottom of 300t Reblown Converter: Yun Huang1; 1Chong Qing University

9:30 AM
Optimization of Zn-Al-Fe Alloy Vacuum Distillation Experiments by Response Surface Methodology: Zhenghao Pu1; Yifu Li1; Bin Yang1; Huan Zhang1; 1Kunming University of Science and Technology

9:50 AM Break

10:10 AM
Study on Separation of Sn-Sb Alloy by Vacuum Distillation: Yanjun You1; Zhonghao Pu1; Yifu Li1; Bin Yang1; Junjie Xu1; 1Kunming University of Science and Technology

10:30 AM
TCOX: Predicting Complex Metallurgical Processes for Steel and Slag Interactions: Lina Kjellqvist1; Paul Mason1; 1Thermo-Calc Software AB, 2Thermo-Calc Software Inc

10:50 AM
Statistical Optimization of Tungsten Carbide Synthesis Parameters: Grant Wallace1; Jerome Downey1; Jannette Chorney1; Trenin Bayless1; Katie Schumacher1; 1Montana Tech

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Treatment and Recycling of Wastes

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinkilic, Atılım University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Thursday AM | March 14, 2019
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Session Chairs: Zhiwei Peng, Central South University; Camille Fleuriault, Gopher Resource

8:30 AM Introductory Comments

8:35 AM
Effect of Chemical Composition on the Crystallization Behavior of Rare Earth Phase in Slag: Tengfei Ma1; Fu Feng1; Xuefeng She1; Jingsong Wang1; Qingsuo Xue1; 1University of Science & Technology Beijing

8:55 AM
Effects of Steel Scrap Oxidation on the Scrap Preheating Process in an Electric Arc Furnace: Guangwu Tang1; Yuchao Chen1; Armin Silaeni1; Yury Krotov2; Chenn Zhou3; 1Purdue University Northwest; 2Steel Dynamics Inc.

9:15 AM
Enriching and Separating Iron Impurity from Galvanizing Dross by Super-gravity Technology: Anjun Shi1; Zhe Wang1; Lei Guo1; Zhancheng Guo1; 1University of Science and Technology Beijing

9:35 AM
Industrial Practice and Process Improvement of RHF Process in China: Chaozhen Cao1; Fangxin Yan1; Xin Li1; Fuming Zhang1; 1Beijing Shougang International Engineering Technology Co., Ltd.

9:55 AM
Study on Modification of Inclusions in 16MnCrS5 Gear Steel by Mg Content: Qiankun Yang1; Zhiqi Zeng1; Jie Li1; 1Shanghai University

10:15 AM Break

10:35 AM
Parameters of the Metallic Calcium Reduction from Magnesium Production Residues: Kerem Tasyurek1; Onuralp Yücel1; Mehmet Bugdayciz1; 1Istanbul Technical University; 2Yalova University

10:55 AM
Production of Premium Grade Iron Nuggets from the Pudo Iron Ores Using End-of-life Rubber Tyre as Reductant: James Dankwah1; James Dankwah2; Jessica Dankwah2; Emmanuel Abotar2; 1Silaen Steel Dynamics Inc.

11:15 AM
Smelting Studies for Recovery of Iron from Red Mud: Ender Keskinkilic1; Saeid Pourmaderi1; Ahmet Geveci1; Yavuz A. Topkaya2; 1Atılım University; 2Middle East Technical University
11:35 AM
Optimization on Drying of Acid Leaching Slag by Microwave Heating Using Response Surface Methodology: Xuemei Zheng1; Aiyuan Ma2; Hairong Gao3; Xiaoling Li4; Xianzhu He5; Min Sun6; Fengjiao Gu1; 1Liupanshui Normal University

11:55 AM
Research on Comprehensive Recovery and Harmless Treatment Process of Copper Smelting Slag: Dongbo Li1; Yaguang Guo2; Shaoliang Liang2; Deng Ma3; 1China ENFI Engineering Corporation

12:15 PM Concluding Comments

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs III

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

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Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University

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8:30 AM Invited
Measuring Chromium in SOFC Systems: Jeffrey Fergus1; 1Auburn University

8:55 AM Invited
Poisoning and Recovery Mechanism of SOFC Cathode: Teruhisa Horita1; 1Aist

9:20 AM Invited
Rare Earth Nickelate Cathodes for Air Independent Operation of Solid Oxide Fuel Cells: Srikanth Gopalan1; Jane Banner1; 1Boston University

9:45 AM Break

10:05 AM Invited
Heterostructuring Using Core-Shell Nanosynthesis: Srikanth Gopalan1; Ben Levitas1; 1Boston University

10:30 AM
Atomic Scale Study of the Anti-vortex Domain Structure in Polycrystalline Ferroelectric: Xiaobao Tian1; Xiaoqiao He2; Haidong Fan1; 1Sichuan University; 2City University of Hong Kong

10:50 AM Invited
Electrophotorecoger Deposition of Gadolinium-doped Ceria as a Barrier Layer on Yttrium-stabilized Zirconia Electrolyte for Solid Oxide Fuel Cells: Shanshan Hu1; Wenyuan Li1; Xingbo Liu1; 1West Virginia University

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Properties

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

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Session Chair: Daniel Coughlin, Los Alamos National Laboratory

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8:30 AM Invited
Examinaton of the Influence of Additive Processing on the Mechanical Properties and Corrosion of Alloy 625: Richard Richer1; Mark Sloudt2; Lyle Levine1; Eric Lass1; Thien Phan3; Daniel Ng2; 1National Institute of Standards & Technology; 2Inha University

9:00 AM
The Creep Behavior of Additively Manufactured Incconel 625: Kwangtae Son1; Michael Kassner1; Lyle Levine1; Thien Phan2; Mark Sloudt2; Kee-Ahn Lee2; 1University of Southern California; 2National Institute of Standards and Technology; 3Inha University

9:20 AM
Evolution of Deformation Structures Across Length Scales from Fabrication to Fracture in Additively Manufactured 316L Stainless Steel: Kaila Bertsch1; Gabriel Meric de Bellefon1; Behzad Rankouhi2; Dan Thoma2; 1University of Wisconsin-Madison

9:40 AM
Characterization of Anisotropy within Additively Manufactured Titanium for Topology Optimization: Matthew Vaughn1; Justin Unger1; Andrew Gaynor2; Brandon McWilliams2; James Guest1; Kevin Hemker1; 1Johns Hopkins University; 2U.S. Army Research Laboratory

10:00 AM Break

10:20 AM
Microstructure and Hardness Evaluation of Al Alloys after a Single Laser Scan in Powder Bed Fusion: Holden Hyer1; Le Zhou1; Abhishek Mehta1; Yongho Sohn1; 1University of Central Florida

10:40 AM
Effect of Post Processing on Additively Manufactured WE43 Magnesium Alloy: Leila Sorhah1; James Tomich1; Joshua Hammell1; Fernando Vazquez1; Grant Crawford1; 1Department of Materials and Metallurgical Engineering, South Dakota School of Mines and Technology; 2Additive Manufacturing Laboratory, South Dakota School of Mines and Technology

11:00 AM
Structure / Property (Constitutive and Dynamic Strength / Damage) Characterization of Additively Manufactured (AM) Tantalum: George Gray1; Veronica Livescu1; Carl Trujillo2; David Martinez2; David Jones1; 1Los Alamos National Laboratory
11:20 AM
Effect of Substrate Heating and Beam Focus on Changes in Phase Fraction and Texture in an E-beam AM Ti-6Al-4V Alloy: Rahesh Kamath1; Kin-Ling Sham2; Hahn Choo3; Sean Yoder4; Ryan Dehoff4; Yang Ren2; Xianghui Xiao5; 1University Of Tennessee Knoxville; 2Oak Ridge National Laboratory; 3Argonne National Laboratory

11:40 AM
A Study of Plasma Transfer Arc – Additive Manufacturing Using 17-4 PH Powders: Sandy El Moghazi1; Tonya Wolfe2; Hani Henein3; Leijun Li4; 1University of Alberta

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process-microstructure Relationships I

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

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Session Chairs: Michael Kirka, Oak Ridge National Laboratory; Lee Yousub, Oak Ridge National Laboratory

8:30 AM
Controlling Residual Stress through Changes to Thermal History in Additively Manufactured SS316L: John Roehling1; William Smith1; Gabriel Guss1; Bey Vrancken1; Joseph McKeown1; Manyalibob Matthews2; 1Lawrence Livermore National Laboratory

8:50 AM
Processing-structure Relationships from 3D Characterization of Electron Beam Melted Inconel 718: Andrew Polonsky1; Narendran Raghavan2; McLean Echlin3; Michael Kirka4; Ryan Dehoff5; Tresa Pollock6; 1University of California, Santa Barbara; 2Oak Ridge National Laboratory

9:10 AM
Evolution of a Gradient Microstructure in Direct Metal Laser Sintered A1Si10Mg: Amir Hadadzadeh1; Babak Shalchi Amirkhiz2; Brian Langelier3; Jian Li4; Mohsen Mohammadi5; 1Marine Additive Manufacturing Centre of Excellence—University of New Brunswick; 2CantmetMATERIALS-Natural Resources Canada; 3Canadian Centre for Electron Microscopy (CCEM)-McMaster University

9:30 AM
Microstructure-properties Relationships for Alloy Hastelloy X Fabricated by Additive Manufacturing: Sebastien Dryepondl; Mike KIRKA1; Fred List2; 1Oak Ridge National Laboratory

9:50 AM
Microstructure Modeling in Wire Arc Additive Manufacturing Process: Ranadip Acharya1; Alex Staroselsky2; John Sharon3; Kenneth Smith4; Michael Kiecka5; Tahany El-Wardany6; William Tredway7; 1UtC Research Center

10:10 AM Break

10:30 AM
Solidification of Additively Manufactured Nanofunctionalized Metals: Mark O’Masta1; Eric Clough2; Jacob Hundley3; John Martin4; 1HRL Laboratories

10:50 AM
The Effect of Process Parameters on Microstructural Evolution in Reduced-dimensionality Samples during Additive Manufacturing: Kaila Bertschi1; Bailey Kuehl2; Dan Thoma3; 1University of Wisconsin-Madison

11:10 AM
Effect of a Vertical Magnetic Field on the Microstructure and Tensile Properties of A1Si10Mg Alloy Produced via Laser Additive Manufacturing: Dafan Du1; Anping Dong1; Da Shu1; Baode Sun2; 1Shanghai Jiao Tong University

11:30 AM
The Effect of Applied Magnetic Field on Laser Additive Manufacturing: Andrew Koo1; Teddy Gan2; Ivars Kraitins3; Biao Cai1; Koulis Pericleous4; 1University of Greenwich; 2University of Birmingham

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session V

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Nikolas Hrabe, National Institute of Standards and Technology - Boulder; Steve Daniewicz, University of Alabama; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University

Thursday AM | March 14, 2019
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Session Chair: Nik Hrabe, National Institute of Standards and Technology

8:30 AM Invited
Additive Materials Behavior: Fatigue Case Studies: Amber Andreaco1; Eric Ott1; Rajendra Kelkar2; 1GE Additive

9:00 AM
Effect of Laser Shock Peening Processing Parameters on the Microstructure, Residual Stress, and Fatigue Behavior of Additively Manufactured CoCr Alloy: Micheal Kattoura1; Jan Kaufman2; Boetang Twum Donkor3; Seetha Ramaiah Mannava4; Vijay Vasudevan1; 1University of Cincinnati; 2HILASE Centre

9:20 AM
The Effect of Heat Treatment and Alloying of Ni-Ti Alloy with Copper on Improving Its Fatigue Life: Wisam Abu Jadayil1; Duoa Sehan1; 1American University of Ras Al Khaimah

9:40 AM
Role of Multi-scale Microstructural Features in Tensile, Compressive, Fatigue, and Fracture Behavior of Direct Metal Laser Sintered Inconel-718: Nicholas Ferreri1; Saeeed Ghorbanpour2; Jonathan Bicknell3; Sven Vogel4; Marko Knezevic5; 1University of New Hampshire; 2Turbocam International; 3Los Alamos National Laboratory

10:00 AM Break

10:20 AM Invited
Sources of Scatter in the Fatigue Behavior of Ti-6Al-4V Fabricated via Electron Beam Melting: Peeyush Nandwana1; Sean Yoder1; Vincent Paquist1; Michael Kirka2; Erkan Cakmak2; Sudarsanam Babu3; Ryan Dehoff4; 1Oak Ridge National Laboratory
10:50 AM
Implications of Post-processing Induced Microstructural Changes on the Deformation and Fracture Behavior of Additively Manufactured Ti6Al4V Alloy: Lara Draelos1; Xinzhu Zheng1; Ryan Dehoff2; Peeyush Nandwana3; Ankit Srivastava1; 1Texas A&M University; 2Oak Ridge National Laboratory

11:10 AM
Manipulation of Defects, Crystallographic Texture and Tensile Properties in Additively Manufactured Ti-6Al-4V Parts: Jake Benzing1; Nikolas Hrabe2; Ryan White3; Magnus Ahlforss1; 1National Institute of Standards and Technology - Boulder, CO; 2Quintus Technologies

11:30 AM
Effects of Hot Isostatic Pressing Temperature on the Static and Dynamic Properties of Selective Laser Melted Ti-6Al-4V Solid Material: Oscar Quintana1; William Relue2; Nia Hightower1; 1DePuy Synthes

### ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ti-based Systems

**Sponsored by:** TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Bji-Na Kim, LPW Carpenter Additive; Eric Lass. National Institute of Standards and Technology; Mohsen Asie Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Thursday AM | March 14, 2019

**221C | Henry B. Gonzalez Convention Center**

**Session Chair:** Ryan Dehoff, Oak Ridge National Laboratory

8:30 AM
Invited Processing - microstructure - property Relationships in EBM processed Ti-6Al-4V: Soumya Nag1; Richard DiDomizio2; Mallikarjun Karadge3; Ian Spinelli4; David Bogdan1; Varamon Dheeradhada5; Mattias Fager1; Jessica Shepard3; Isak Elfstrom1; 1GE Global Research; 2GE Additive

9:00 AM
Micromechanical Behavior and Thermal Stability of a Dual-phase a+a” Titanium Alloy Produced by Additive Manufacturing: Charlotte de Formanoir1; Sébastien Allain2; Guilhem Martin2; Frédéric Prima1; Yves Bréchet2; Stephane Godet3; 1KU Leuven; 2Université de Lorraine; 3Université de Grenoble; 4Chimie ParisTech; 5Universite Libre De Bruxelles

9:20 AM
Hydrogen-enabled Heat Treatment for Improving the Mechanical Properties and Reliability of Additively Manufactured Titanium Alloy Components: James Paramore1; Brady Butler2; Jonathan Ligda1; Nathaniel Saenz2; Matthew Dunstan1; 1United States Army Research Laboratory

9:40 AM
Towards Building Tailored Microstructures in Additively Manufactured Ti-6Al-4V Alloy by Combining a Mesoscale Phase Field Model with a Continuum Scale Thermal Finite Element Model: Patrick O’Toole1; Dayalan Gunasegaram1; Anthony Murphy1; Vu Nguyen5; Sharen Cummins1; 1Commonwealth Scientific Industrial Research Organisation (CSIRO)

10:00 AM Break

10:20 AM
Phase-field Simulation of Microstructure Evolution during Additive Manufacturing of Ti-6Al-4V Alloys: Yanzhou Ji1; Lei Chen2; Long-Qing Chen3; 1Pennsylvania State University; 2Mississippi State University

10:40 AM
Microstructure Investigation of Ti-6Al-4V Builds with Superior Ductility Produced by Direct Laser Melting: Kun Yang1; Geoff de Looze2; Robert Wilson1; 1Metal Industries, CSIRO Manufacturing

11:00 AM
Prediction of the Resultant Phases and Hardness of Laser Direct Deposited Ti6Al4V: Shunyu Liu1; Kyung-Min Hong2; Christopher Katina1; Yung Shin1; 1Purdue University

11:20 AM
Production of Ti-6Al-4V Alloy by 3D Electron Beam Melting Technique and Development of its Post Treatments: Merve Nur Dogu1; Ziya Esen1; Arcan F. Dericoglu1; Evren Tan1; Berkay Gümüş1; 1Middle East Technical University; 2Cankaya University; 3ASELSAN

11:40 AM Concluding Comments

### ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM II

**Sponsored by:** TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Behrang Pooranji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Thursday AM | March 14, 2019

**221D | Henry B. Gonzalez Convention Center**

**Session Chairs:** Andrew Wessman, GE Additive; Sneha Prabha Narra, Worcester Polytechnic Institute

8:30 AM
Innovative Design of Metallic Materials using Additive Manufacturing: Dan Thoma1; Behzad Rankouhi2; Krishnan Suresh1; Janine Erickson3; Kaila Bertsch4; Gabriel Meric De Bellefon5; 1University of Wisconsin - Madison

8:50 AM
Al Alloy Design for Additive Manufacturing: Mageshwari Komarasamy1; Kaimiao Liu2; Le Zhou2; Holden Hyer3; Yongho Sohn3; Rajiv S. Mishra4; 1University of North Texas; 2University of Central Florida

9:10 AM
Surface Inoculation of Aluminium Powders for Additive Manufacturing Guided by Differential Fast Scanning Calorimetry: Lennart Tausche1; Kay-Peter Hoyer1; Evgeny Zhuravlev1; Guido Grundmeier1; Mirko Schaper2; Olaf Keßler2; 1Forderhochschule University; 2University of Rostock, Competence Center CALOR; 3University of Rostock

9:30 AM
Additive Manufacturing Alloys: Fabrication of Aluminum Matrix Composites: Jakob Hamilton1; Mouda Tung2; Ola Harrysson3; Shalabh Gupta3; Iris Rivero4; Christopher Rock4; 1Iowa State University; 2North Carolina State University; 3AMES Laboratory; 4Rochester Institute of Technology
9:50 AM
Solubility of Ni, Co and Mn in a Lightweight Al-based High Temperature Intermetallic Phase: Sujelio Soto-Medina; Biswas Rijal; Lilong Zhu; Richard Hennig; Michele Manuel; 1University of Florida

10:10 AM Break

10:30 AM
Microstructure and Mechanical Properties of Novel a/8 Titanium Alloys Designed for Additive Manufacturing: Marco Simonelli; Nesma Aboukhair; Rui Rui; Adam Clare; Richard Hague; 1University Of Nottingham; 2Loughborough University

10:50 AM
Understanding the Transition Properties of Laser Deposited, Compositionally Graded Structures: Himanshu Sahasrabudhe; 1Michigan State University

11:10 AM
Advantages of Novel Al-Si Alloy with Cu Additive for Printing Parts via SLM Process: Viktor Mann; Alexander Krokhin; Roman Vakhromov; Dmitry Ryabov; Vladimir Korolev; Daria Daubarayte; Ivan Mikhailov; 1RUSAL Global Management B.V.; 2Light Materials and Technologies Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Binder Jetting I

Sponsored by: TMS: Powder Materials Committee, TMS: Additive Manufacturing Committee

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielius, University of Pittsburgh; Nihan Tuncer, Desktop Metal

Thursday AM | March 14, 2019
223 | Henry B. Gonzalez Convention Center

Session Chair: Amy Elliott, Oak Ridge National Laboratory

8:30 AM
Densification of H13 Tool Steel Components Fabricated via Binder Jet Additive Manufacturing for Tooling Applications: Peeyush Nandwana; Derek Siddel; Chris Shafer; Amy Elliott; 1Oak Ridge National Laboratory

8:50 AM
Binder Development in Binder Jet Additive Manufacturing for Sand-casting: Dustin Gilmer; Michelle Lehmann; Amy Elliott; Tomonori Saito; 1University of Tennessee; 2Oak Ridge National Laboratory

9:10 AM
Determination of Saturation Limits in Binder Jetting: Nathan Crane; Jeremy Crane; 1University of South Florida

9:30 AM
Binder Development for Binder Jet Additive Manufacturing: Dustin Gilmer; Michelle Lehmann; Amy Elliott; Tomonori Saito; 1Oak Ridge National Laboratory

9:50 AM Break

10:10 AM
The Effect of Powder Characteristics on the Binder Jet Process: Derek Siddel; Chris Shafer; Desarae Goldsby; Peeyush Nandwana; Amy Elliott; 1Oak Ridge National Laboratory

10:30 AM
Binder Jetting Printing of Functional Ceramics: Luis Chavez; Carlos Diaz; Christian Rodarte; David Espalin; Ryan Wicker; Yirong Lin; 1University of Texas at El Paso

10:50 AM
Mitigating Distortion During Sintering of Binder-jet Printed Ceramics: Lynessa Grant; Magdi Alameen; C. Higgs; Zachary Cordero; 1Rice University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VII

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyenlein, University of California, Santa Barbara; Wolfgang Panteleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Thursday AM | March 14, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Rodney McCabe, Los Alamos National Laboratory

8:30 AM
Three-dimensional Microstructure Effects on Twin Nucleation and Growth in HCP Metals: Rodney McCabe; Shujuan Wang; Thomas Nizolek; Arul Mariyappan; 1Los Alamos National Laboratory

8:50 AM

9:10 AM
The Competition between Deformation Twin Nucleation and Thickening in Nanostructured FCC Materials: Matthew Daly; Ashok Kumar; Glenn Hibbard; Chandra Veer Singh; 1University of Illinois at Chicago; 2University of Toronto

9:30 AM
Study of Temperature Dependence of Plasticity in β-tin and Titanium using Nanoindentation and Constitutive Modelling: Zhuowen Zhao; Aritra Chakraborty; Thomas Bieler; Jon Molina-Aldareguia; Martin Crimp; Philip Eisenlohr; 1Michigan State University; 2IMDEA Materials

9:50 AM Break

10:10 AM
To Twin or Not to Twin in Boron Carbide: Kelvin Xie; Rich Haber; Jim McCauley; Kevin Hemker; 1Texas A&M University; 2Rutgers University; 3Johns Hopkins University

10:30 AM
Understanding the Mechanical Response of Brittle Single Crystals Combining Micromechanical Analyses and Simulations: Manuel Gruber; Alexander Leitner; Peter Supancic; Daniel Kiener; Raul Bermejo; 1University of Leoben
10:50 AM
Effect of Severe Shear Deformation and Crystal Orientation on the Local Hardness of Ti-6Al-4V Chips Obtained from Turning using Nanoindentation Mapping and Electron Backscatter Diffraction Mapping: Jiawei Liu; Thomas Bieler; Patrick Kwon; Michigan State University

11:10 AM
Quantifying In-plane Deformation by Integrating Indentation and Digital Image Correlation: Mengying Liu; Ian McCue; Michael Demkowicz; Texas A&M University

11:30 AM
Stress Obtained from Digital Image Correlation for Two Dimensional Microstructures: Benjamin Cameron; Cem Tasan; Massachusetts Institute of Technology

11:50 AM
On the Shear Band Nucleation and Flow Transitions in Cutting of Metals: Swetabh Yadav; Dinakar Sagapuram; Texas A&M University

ADVANCED MATERIALS

Advanced High-Strength Steels III — High-Performance Steels II

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Thursday AM | March 14, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Katherine Sebeck, TARDEC; MingXin Huang, University of Hong Kong

8:30 AM
Phase Transformations in High-nickel Steel Weld Deposits with a Non-equilibrium Hierarchical Microstructure: Amir Farrooshi; Daniel Bechetti; Matthew Sinfield; Jeffrey Farren; David Seidman; Northwestern University; Naval Surface Warfare Center; Northwestern University

8:50 AM
High-alloy CrMnNi Cast Steel Studied by Nano Indentation: Robert Lehner; Anja Weidner; Mykhaylo Motylenko; Horst Biermann; Technische Universität Freiberg

9:10 AM
Dynamic Deformation Behavior of an Fe-Ni-C High Strength, High Toughness Steel: Ian Harding; Sharanv Kumar; Brown University

9:30 AM
The Stability of Precipitated Austenite in Fe-10Ni-0.5 Mn-0.1C Steel: Ian Harding; Isabelle Mouton; Baptiste Gault; Dierk Raabe; Sharanv Kumar; Brown University; Max Planck Institut für Eisenforschung GmbH

9:50 AM Break

10:10 AM
Effect of Aging on the Microstructural Evolution in a New Design of Maraging Steels with Carbon: Peng Gong; William Rainforth; The University of Sheffield

10:30 AM
Rapid Screening of Mechanical Responses of Lath Martensite in a New Generation of Maraging Steels: Effect of B and Nb: Sepideh Parvinian; Surya Kalidindi; Hamid Garmestani; Georgia Institute of Technology

10:50 AM
Interplay of Microstructure and Deformation Behavior in Low Interlayer Misfit Precipitates-Containing 19Ni3Mo1.5Ti Maraging Steel: Kun Li; Bing Yu; R.D.K. Misra; UTEP

11:10 AM
High-strength T91 Ferritic/Martensitic Steel by Thermo-mechanical Treatment: Zhongxia Shang; Jie Ding; Cuncai Fan; Miao Song; Jin Li; Qiang Li; Sichuang Xue; Karl Hartwig; Xinghang Zhang; Purdue University; University of Michigan; Texas A&M University

11:30 AM
Structure and Properties of Oxide Dispersion Strengthened Austenitic Stainless Steels: P Sai Karthik; Vijay Ravula; M Ramakrishna; A.V Reddy; G Sundararajan; International Advanced Research Centre Arci

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development in Rare Earth Free Permanent Magnets

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Thursday AM | March 14, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Hunter Henderson, Oak Ridge National Laboratory

8:30 AM Invited
Exploring New Magnetic Materials Using Bottom-up Processing: Jeffrey Shield; University of Nebraska

9:00 AM Invited
Permanent Magnets Based on MnAl: Microstructure, Magnetic Properties and Thermal Stability: Thomas G. Woodcock; IFW Dresden

9:30 AM
Investigation of Heat Treating, Powder Processing, and Properties of Gas Atomized High Ti alnico and Co-lean Alnico for Use in Permanent Magnet Motors: Emily Rinko; Iver Anderson; Aaron Kassen; Emma White; Wei Tang; Lin Zhou; Jason Pries; Matthew Kramer; Iowa State University; Ames Laboratory; Oak Ridge National Laboratory

9:50 AM Break

10:10 AM Invited
Recent Advances in Theoretical and Experimental Study of Rare-earth-free a-Fe16N2 Magnet: Bin Ma; Jianping Wang; Md Mehidri; Yanfeng Jiang; ECE, University of Minnesota

10:40 AM Invited
Role of Solidification and Phase Section in Magnet Alloy Production: Matthew Kramer; Ames Laboratory
ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Pb-free Solder Alloys II

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Estefania A. da Silva, Universiti Malaysia Perlis

Thursday AM | March 14, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Zhi-Quan Liu, Chinese Academy of Sciences; Liang Zhang, Jiangsu Normal University; Kazuhiro Nogita, The University of Queensland

8:30 AM
Role of Surface Chemistry of Solder Particles in Performance of Solder Pastes: Amir H. Nobari; Arslane Bouchemiti; Ana Da Silva Marques; Sylvain St-Laurent; Gilles L’Espérance; 5N Plus Inc - Micro Powders; École Polytechnique de Montréal

8:50 AM
Micro-structure and Properties of Cu-0.3wt.%Ag Alloy Ultra-fine Wires: Shusen Wang; Yuanwang Zhang; Dawei Yao; Shanghai Electric Cable Research Institute Co., Ltd.

9:10 AM
Length Scale of the Cellular Microstructure Tailoring Tensile Properties of Zn-20wt.%Sn-2wt.%Cu Solder Alloy: Cesar Mangualede; Rodrigo Reyes; José Spinelli; Universidade Federal de São Carlos - UFSCar

9:30 AM
Refined Manufacturing Acceleration Process (ReMAP) M3: Thermal Preconditioning and Restoration of Bismuth-containing Lead-free Solder Alloys: Andre Delhaise; Polina Snugovsky; Jeffrey Kennedy; David Hillman; Stephan Meschter; David Adams; Milea Kummer; Warren Harper; Marianne Romansky; Joseph Juarez; Ivan Straznicky; Ivan Tan; Ivan Matijevic; Leonid Snugovsky; Mikaela Brantl; Ross Wilcoxon; Doug Perovic; Celestica; Rockwell-Collins; BAE Systems; Honeywell Aerospace; Curtiss-Wright; University of Toronto

9:50 AM Break

10:10 AM
The Microstructure Evolution and Oxidation Characteristics of Sn58Bi Solder Joints under the Oxidizing Environment: Yishu Wang; Limin Ma; Fu Guo; Beijing University of Technology

10:30 AM
The Thermomechanical Reliability at High Temperatures of Pb Free Solders: Faramaz Hadidnia; Harry Schoeller; Eric Cotts; Binghamton University; Universal Instruments Corporation

10:50 AM Concluding Comments

CHARACTERIZATION

Advanced Real Time Imaging — Phase Transformation I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yong-sug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Thursday AM | March 14, 2019
302B | Henry B. Gonzalez Convention Center

Session Chairs: Noritaka Saito, Kyusyu University; Hideyuki Yasuda, Kyoto University

8:30 AM Invited Characterising Local Phase Transformations and Kinetics using In Situ High Voltage TEM: Kazuhiro Nogita; Flora Somidin; Hiroshi Maeno; Xuan Tran; Stuart McDonald; M.A.A. Mohd Salleh; Syo Matsumura; University of Queensland; Kyushu University; Universiti Malaysia Perlis

9:00 AM Time-resolved Fast-tomography for Observing Solidification in Metallic Alloys: Hideyuki Yasuda; Yuta Tomiyori; Takuya Kawarasaki; Yuichi Kato; Kohei Morishita; Kentaro Kajiwara; Akihisa Takeuchi; Kentaro Uesugi; Kyoto University; Kyushu University; JASRI/SPRING-8

9:30 AM Combined Synchrotron Radiography and EBSD Studies of Solder Joint Solidification: Jingwei Xian; Sergey Belyakov; M.A.A. Mohd Salleh; Kazuhiro Nogita; Hideyuki Yasuda; Christopher Gourlay; Imperial College London; Universiti Malaysia Perlis (UniMAP); The University of Queensland; Kyoto University

9:50 AM Invited Characterization of Microstructural Development by Combining High Temperature Microscopy with Differential Thermal Analysis: Sut-Chun Moon; Dominic Phelan; Rian Dippenaar; University of Wollongong

10:20 AM Break

10:40 AM Quantitative Thermal Analysis of Solidification in a High-temperature Laser-scanning Confocal Microscope: Dasith Liyanage; Suk-Chun Moon; Madeleine Du Toit; Rian Dippenaar; University of Wollongong

11:00 AM In Situ Investigation of Pt-Rh Thermocouple Degradation by P-bearing Gases: Anna Nakano; Jinichiro Nakano; James Bennett; U.S. Department of Energy National Energy Technology Laboratory/ AECOM; U.S. Department of Energy, National Energy Technology Laboratory
THURSDAY AM

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Atomistic and Coarse-grained Methods

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday AM | March 14, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Avinash Dongare, University of Connecticut; Kiran Solanki, Arizona State University

8:30 AM Invited
Atomistic Simulation Methods for Computing Character Angle and Stress-State Dependent Dislocation Properties: Douglas Spearot1; Khanh Dang1; 1University of Florida

9:00 AM
Role of Interstitial Oxygen Impurity Effects on Macroscopic Deformation and Fatigue Behavior of Commercially Pure Titanium: Benyamin Bazehhour1; Chaitanya Kale1; Kiran Solanki2; 1Arizona State University

9:25 AM
Variational and Multiscale Modeling of Amorphous Silica Glass: William Schill1; Michael Ortiz2; 1California Institute of Technology

9:50 AM Invited
Quasi-coarse-grained Dynamics Simulations to Investigate the Mechanisms of Void Nucleation and Evolution during Dynamic Failure of Multiphase Metallic Materials at the Mesoscales: Avinash Dongare1; Sergey Galitskiy3; Marco Echeverria1; Sumit Suresh1; 1University of Connecticut

10:20 AM Break

10:40 AM
Modeling the Nucleation, Growth and Coalescence Behavior of Voids during Spall Failure of Al Microstructures at Mesoscales using Quasi-Coarse-Grained Dynamics (QCGD) Simulations: Garvit Agarwal1; Avinash Dongare1; 1University of Connecticut

11:00 AM
Modeling of Spall Behavior of Aluminum due to Laser Induced Shock at the Mesoscales: Sergey Galitskiy1; Dmitriy Ivanov2; Avinash Dongare1; 1University of Connecticut; 2University of Kassel

11:20 AM
Kinetics of Micro-structure Evolution and Failure of Mg with Supersaturated Vacancies: Sara Adibi Sedeh1; Justin Wilkerson1; 1Texas A&M University

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Non-local Methods: Peridynamics and Phase-field

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday AM | March 14, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Srujan Rokkam, ACT Inc; Michael Tonks, University of Florida

8:30 AM Invited
Peridynamic Analysis of Material Failure: Stewart Silling1; 1Sandia National Laboratories

9:00 AM
A Generalized Peridynamic Framework for Modeling Corrosion Mechanics, Damage and Failure in Metallic Alloys: Srujan Rokkam1; Masoud Behzadinasab2; Max Gunzburger3; Nam Phan4; 1Florida State University; 2Def-Aero, Advanced Cooling Technologies Inc; 3Florida State University; 4Naval Air Systems Command

9:20 AM
A Simplified Nonlocal Multiphysics Model for Local Corrosion: Eitan Lees1; Sachin Shanbhag2; Srujan Rokkam1; Max Gunzburger3; 1University of Florida; 2Def-Aero, Advanced Cooling Technologies Inc

9:40 AM
A Stabilized Hypoelastic Constitutive Correspondence Model for Peridynamics: Masoud Behzadinasab2; John Foster1; 1University of Texas at Austin

10:00 AM Break

10:20 AM
A Modified Phase-field Model for Quantitative Simulation of Crack Propagation in Single-phase and Multi-phase Materials: Arezoo Emdadi1; Mohsen Asle Zaeem2; 1University of Virginia; 2Colorado School of Mines

10:40 AM
Uncertainty Quantification and Validation of a UO2, Phase Field Fracture Model: Chaitanya Bhave1; Michael Tonks2; Jie Lian3; 1University of Florida; 2Rensselaer Polytechnic Institute

11:00 AM
Phase-field Modeling of Coupled Amorphization and Fracture in Boron Carbide: Lei Cao1; 1University of Nevada, Reno

11:20 AM
Phase-field Modeling of Microstructure Dependent Fracture in Anisotropic UO2 Polycrystals: Wen Jiang1; Larry Aagesen1; Yongfeng Zhang1; 1Idaho National Laboratory

11:40 AM
Effect of Multi-gating System on Solidification of Molten Metals in Spur Gear Casting: A Simulation Approach: Oluseyi Ajayi1; Enesi Salawu1; 1Covenant University, Ota, Nigeria
LIGHT METALS
Aluminum Alloys, Processing and Characterization — Casting and Solidification

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

Thursday AM | March 14, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Dmitriy Eskin, Brunel University

8:30 AM Introductory Comments
8:35 AM
Comparison of Diversified Casting Methods on Mechanical and Microstructural Properties of 5754 Aluminum Alloy for Automotive Applications: Ali Malcioglu1; Cisem Dogan1; Canan Inel1; 1Asas Aluminyum San. Tic. A.S
9:00 AM
The Effect of High Speed Direct Chill Casting on Microstructure and Mechanical Properties of Al-Mg-Si-Fe Alloy: Haitao Zhang1; Dongtao Wang2; Jianzhong Cui2; Hiromi Nagaumi3; Weizhong Fan3; 1Soochow University; 2Northeastern University; 3Guangdong Hongbang Metal Aluminum Co., Ltd
9:25 AM
Multi-component High Pressure Die Casting (M-HPDC): Temperature Influence on the Bond Strength of Metal-plastic-hybrids Manufactured by M-HPDC: Patrick Messer1; Arthur Bulinger1; Uwe Vroomen1; Andreas Bührig-Polaczek1; 1RWTH Aachen University
9:50 AM
On Microstructures, Textures and Formability of AA6xxx Alloy Sheets from DC and CC Processing: Xiyu Wen1; Randall Bowers1; Shridas Ninglieri1; 1Secat Inc
10:15 AM Break
10:30 AM
Prototyping of a High Pressure Die Cast Al-Si Alloy Using Plaster Mold Casting to Replicate Corresponding Mechanical Properties: Toni Bogdanoff1; Ehsan Ghassemali1; Martin Riestra1; Salem Seifeddine1; 1Jonkoping University
10:55 AM
Reduction of Aluminium Ingot Cooling Time in DC Casting Process: Josée Colbert1; André Larouche1; 1Rio Tinto
11:20 AM
Impact of the Main Casting Process Parameters on Floating Crystals in Al Alloys DC-Cast Ingots: Mousa Javidani1; Martin Fortier1; Josee Colbert1; 1Rio Tinto

LIGHT METALS
Aluminum Reduction Technology — Environmental Issues including PFC Emissions

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Marc Dupuis, GeniSim Inc

Thursday AM | March 14, 2019
004 | Henry B. Gonzalez Convention Center

Session Chair: Stephan Broek, Hatch Ltd

8:30 AM Introductory Comments
8:35 AM
Understanding of Co-evolution of PFC Emissions in EGA Smelter with Opportunities and Challenges to Lower the Emissions: Al Jassim1; Sergey Akhmetov2; Abdalla Ahmed Alzarooni3; Daniel Whitfield4; Barry Welch4; 1EGA; 2UNSW
9:00 AM
Results from Fluoride Emission Reduction Projects in Alcoa Baie-Comeau: Stephan Broek1; Yves Béliveau2; Stephen Lindsay3; Julie Dontigny2; Sylvain Bouthillier4; Carl Dore5; Diego Oltab6; 1Hatch Ltd; 2Alcoa
9:25 AM
Validation of PFC Slope at Alcoa Canadian Smelters with Anode Effect Assessment and Future Implications to Add Low Voltage Emissions into Total PFC Emissions: Christine Dubois1; Luis Espinoza-Nava2; Elizer Batista2; Alexandre Martin-Dubreuil2; 1University of Toronto; 2University of Toronto
10:15 AM Break
10:30 AM
Migration Behavior of Fluorides in Spent Potlining during Vacuum Distillation Method: Nan Li1; Lei Gao2; Kinnor Chattopadhyay2; 1Hong He University; 2University of Science and Technology; 3University of Toronto
10:55 AM
HF and SO2 Multipoint Monitoring on Large Gas Treatment Centers (GTCs) with Prewarning Abilities: Anders Sorhus1; Sivert Ose2; Eivind Holmefjord3; 1GE Power
11:20 AM
DFT Study on COS Oxidation Reaction Mechanism: Jie Li1; Tianshuang L1; Hongliang Zhang1; Jingkun Wang1; Kena Sun1; Jin Xiao1; 1Central South University
11:45 AM Concluding Comments
**Biomaterials**

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces VI

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

**Thursday AM | March 14, 2019**

217C | Henry B. Gonzalez Convention Center

**Session Chairs:** Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado

**8:30 AM**

Engineered Enzyme/Gold Biomaterial Interface Offers Improved Catalytic Stability. Rachel Litz¹; Mark Richter¹; Candan Tamerler¹; ¹University of Kansas

**8:50 AM**

Generation of Nanoparticle-embedded Honeycomb like Porous Scaffolds via a Microfluidic T-junction. Xinyue Jiang¹; Merve Gultekinoglu¹; Cem Bayram¹; Kezban Ulubayram¹; Mohan Edirisinghe¹; ¹University College London

**9:10 AM Invited**

Bio Nano Data Convergence: Establishment of a Biomaterials Ontology. Rebecca Reiss¹; Terry Lowe²; ¹New Mexico Institute of Mining and Technology; ²Colorado School of Mines

**9:40 AM**

Biomimetic Wrinkle Graphene Surfaces with Switchable Adhesion. Yiyang Wan¹; Yong Gao¹; Zhenhai Xia¹; ¹University of North Texas; ²Northwestern Polytechnical University

**10:00 AM Break**

**10:20 AM**

Mechanics of Collagen Fibril-CNT Composites. Marco Fielder¹; Arun Nair¹; ¹University of Arkansas

**10:40 AM**

Transparent Titanium Dioxide Nanotubes: Processing, Characterization, and Application in Establishing Cellular Response Mechanisms. Jevin Meyerink¹; Divya Kota¹; Scott Wood¹; Brandon Scott¹; Robert Anderson¹; Grant Crawford¹; ¹South Dakota School of Mines & Technology

**11:00 AM**

Accumulation of Biofilm on Ti-6Al-4V Alloy Fabricated Using Additive-layer-manufacturing. Mari Kalie¹; Tetsuro Horie¹; Richard Mitchell²; Toru Okabe²; ¹The Nippon Dental University; ²University of Kentucky College of Dentistry; ³Baylor College of Dentistry

**11:20 AM**

Magnesium Based Microfabricated Biodegradable Power Source Transient Implantable Devices. Zia Ur Rahman¹; Waseem Haider¹; ¹Central Michigan University

**11:30 AM**

Electrochemical Corrosion Protocol for Biomaterial Alloys. Vineeth Kumar Gattu¹; Javier Obregon²; J Ernesto Indacochea³; William Ebert¹; ¹Argonne National Laboratory; ²University of Illinois at Chicago; ³Central Michigan University

**12:00 PM**

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**8:30 AM**

Antibacterial Mechanism of Cu-bearing Stainless Steel. Xinrui Zhang¹; Chunguang Yang²; Ke Yang³; ¹Institute Of Metal Research; ²University of Zhejiang; ³University of Shandong

**8:50 AM**

Trends in Technology of Operative Antibiotic Therapy: A Review. Matthew Siegel¹; Daniel Li¹; Elan Volchenko¹; Rachel Bergman¹; Fei Yang¹; Dawei Li²; Decheng Wu²; ¹Northwestern University; ²University of Michigan; ³Chinese Academy of Sciences

**9:10 AM**

Freeze Casting Using Tri-axial Magnetic Field Control to Fabricate Materials Inspired by Bone. Isaac Newton¹; Taylor Ogden¹; Paul Wadsworth¹; Max Mroz¹; Jake Abbott¹; Steven Naleway¹; ¹University of Utah

**9:30 AM**

Selective Laser Melted Biodegradable Porous Iron. Yageng Li¹; Holger Jähr¹; Karel Lietaert¹; Prathyusha Pavanram¹; Aytaç Yilmaz¹; Laura Fockaert¹; Marius Leeflang¹; Behdad Pouran¹; Yaiza Gonzalez-Garcia¹; Harrie Weimann¹; Johannes Mol¹; Jie Zhou¹; Amir Zadpoor¹; ¹Delft University of Technology; ²University Hospital RWTH Aachen; ³3D Systems Leuven; ⁴University Medical Center Utrecht

**9:50 AM**

Accelerating Degradation Rate and Enhanced Osseointegration of Zn Composited with Mg. Yufeng Zheng¹; ¹Peking University

**10:10 AM Break**

**10:30 AM**

Accumulation of Biofilm on Ti-6Al-4V Alloy Fabricated Using Additive-layer-manufacturing. Mari Kalie¹; Tetsuro Horie¹; Richard Mitchell²; Toru Okabe²; ¹The Nippon Dental University; ²University of Kentucky College of Dentistry; ³Baylor College of Dentistry

**10:50 AM**

Computational Investigation of Mechanical Behavior of Staggered Composites. Lijiang Lin¹; Mohammad Maghsoudi Ganjeh¹; Xiaodu Wang¹; Xiaowei Zeng¹; ¹University of Texas at San Antonio

**11:10 AM**

Magnesium Based Microfabricated Biodegradable Power Source Transient Implantable Devices. Zia Ur Rahman¹; Waseem Haider¹; ¹Central Michigan University

**11:30 AM**

Electrochemical Corrosion Protocol for Biomaterial Alloys. Vineeth Kumar Gattu¹; Javier Obregon²; J Ernesto Indacochea³; William Ebert¹; ¹Argonne National Laboratory; ²University of Illinois at Chicago; ³Central Michigan University
**ADVANCED MATERIALS**

Bulk Metallic Glasses XVI — Thermal and Other Properties  

**Sponsored by:** TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

**Thursday AM | March 14, 2019**  
206B | Henry B. Gonzalez Convention Center

**Session Chairs:** Robert Maass, University of Illinois at Urbana-Champaign; Fan Zhang, CompuTherm LLC

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8:30 AM Invited  
**Stress- and Temperature-driven Structural Dynamics in a Zr-based Metallic Glass:** Amlan Das1; Robert Maass1; 1University of Illinois at Urbana-Champaign

8:50 AM Invited  
**Evaluation of the Glass Forming Ability of Multi-component Bulk Metallic Glasses by High Throughput Calculation:** Fan Zhang1; Chuan Zhang1; Weisheng Cao1; Shuanglin Chen1; 1CompuTherm LLC

9:10 AM Invited  
**Bulk Metallic Glasses: Correlations between Structure, Stability & Glass Forming Ability:** Kevin Laws1; Daniel Miracle2; Dmitri Louzguine-Luzgin3; 1University of New South Wales; 2Air Force Research Laboratory; 3Tohoku University

9:30 AM  
**Probing Heat Generation during Shear Band Operation by Localized Boiling:** David Brennhaugen1; Konstantinos Georgarakis2; Yoshihiko Yokoyama3; Koji Nakayama3; Lars Amberger4; Ragnhild Aune4; 1Ntu; 2Cranfield University; 3Tohoku University

9:50 AM Break

10:10 AM Invited  
**Bulk Metallic Glasses as Highly Catalytic Materials:** Vahid Hasannaemipour1; Sundeepe Mukherjee2; 1University of North Texas

10:30 AM Invited  
**Modulating Crystallinity of a Ti-Zr-Based Composite Bulk Metallic Glass Matrix:** Kevin Kaufmann1; Tyler Harrington1; Mojtaba Samiee1; Xiao Liu1; Hui Kai Cheng1; Kenneth Vecchio1; 1University of California San Diego; 2Thermo Fisher Scientific

10:50 AM Invited  
**Effect of Oxygen on the Glass Formation and Mechanical Properties of Industrial Grade Zr Based Bulk Metallic Glasses:** Y.X. Wang2; L.Y. Li2; 1Institute of Metal Research, CAS

11:10 AM  
**Phase Equilibria of the Cu-Zr-Ti Ternary System at 703°C and the Thermodynamic Assessment and Metallurgical Glass Region Prediction of the Cu-Zr-Ti Ternary System:** Chu Hsuan Wang1; Gita Novian Hermana1; Chih Hung Lin1; Hsien Ming Hsiao2; Yee Wen Yen1; 1Taiwan Tech; 2Taiwan Institute of Nuclear Energy Research

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**LIGHT METALS**

Cast Shop Technology — Continuous Casting  

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizer:** Pierre-Yves Menet, Constellium Technology Center

**Thursday AM | March 14, 2019**  
007B | Henry B. Gonzalez Convention Center

**Session Chair:** Kai Karhausen, Hydro Aluminium Rolled Products GmbH

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8:30 AM Introductory Comments

8:35 AM  
**Horizontal Single Belt Casting of Aluminum Sheet Alloys:** Roderick Guthrie1; Mihaiela Isacl2; 2McGill Metals Processing Centre

9:00 AM  
**Cast Strip Surface Topography Study and Thermomechanical Processing of 1050 Alloy Produced by One Copper Shell Roll Caster:** Dionisios Spathis1; John Tsiros1; Andreas Mavroudis1; 1Hellenic Aluminum Industry

9:25 AM  
**Influence of Strip Thickness on As-cast Material Properties of Twin-roll Cast Aluminum Alloys:** Vakur Aldogan1; Cemil Isiksaçan1; Hatice Mollaoglu Altun1; Onur Birbas1; Mert Günüüz1; 1Assan Aluminum

9:50 AM  
**Softening Behavior of Direct Chill and Twin-roll Cast AA 3105 Alloy:** Mert Güber1; Onur Meydanoglu1; Cemil Isiksaçan1; 1Assan Aluminyum San. Ve Tic. As

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**CHARACTERIZATION**

Characterization of Materials through High Resolution Imaging — Modeling and Computation for High Resolution Imaging  

**Sponsored by:** TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

**Thursday AM | March 14, 2019**  
303A | Henry B. Gonzalez Convention Center

**Session Chair:** Richard Sandberg, Los Alamos National Laboratory

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8:30 AM Invited  
**Deep Learning of Inverse Problems in Scanning Transmission Electron Microscopy/Scattering:** Nouamane Laanait1; 1Oak Ridge National Laboratory

9:00 AM Invited  
**Coherent Diffraction Imaging at High X-ray Energies:** S Maddali1; J. -S. Park1; P. Keneissi1; J. Almer1; W. Cha1; R. Harder1; Y. Nashed1; S. O. Hruszkewycz1; 1Argonne National Laboratory
9:20 AM Invited
Computational Investigation of Limits of Bragg Coherent Diffraction Imaging: Hande Ozturk1; Ozyegin University

9:40 AM
STEM Diffraction Contrast Image Simulations for Complex Dislocation Configurations: Joseph Tessmer1; Saransh1; Marc De Graef1; Carnegie Mellon University

10:00 AM Break

10:20 AM Invited
Deep Neural Networks for Feature Extraction and Image Reconstruction from Coherent X-ray Diffraction Imaging Data: Mathew Cherukulath1; Yousef Nashed1; Ross Harder1; Argonne National Laboratory

10:40 AM Invited
Learning CDI Reconstructions with Backpropagation: Yousef Nashed1; Argonne National Laboratory

11:00 AM
Multi-angle Bragg Projection Ptychography with Probe Retrieval: Peng Li1; Felix Hofmann2; Steven Leake3; Marc Allain4; Virginie Chamard1; Institut Fresnel, CNRS; University of Oxford; European Synchrotron Radiation Facility; Institut Fresnel, Aix-Marseille University

11:20 AM Invited
Sparse Dictionary Learning Methods for Coherent X-ray Diffractive Imaging: Ashish Tripathi1; Brentt Wohlberg2; Richard Sandberg3; Los Alamos National Laboratory

11:40 AM
Photoelastic Ptychography for Anisotropic Imaging of Optically Transparent Samples: Guido Cadenazzi1; Nicholas Anthony1; Brian Abbey1; ‘La Trobe University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Analysis of Surfaces and Interfaces

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATeRIALS; Shadia Ikkmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday AM | March 14, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Mingming Zhang, ArcelorMittal; Donato Firrao, Politecnico di Torino

8:30 AM Introductory Comments

8:35 AM Invited
A Forward Model for Rapid Characterization of Grain Orientations in α-Ti Using Polarized-light: Brahim Ahdlim1; Christopher Woodward2; Michael Uchic2; UES Inc/Air Force Research Laboratory; Air Force Research Laboratory

8:55 AM
Analyzing Preferential Localized Corrosion along Coherent Twin Boundaries in Pure Nickel via EBSD and Micro-CT: Mengying Liu1; Matteo Seita2; Michael Demkowicz1; Texas A&M University; Nanyang Technological University

9:15 AM
Friction Stir Welding of Aluminum Alloys and Steels: Issues and Solutions: Mian Wasif Safeen1; Pasquale Russo Spena1; Free University of Bozen-Bolzano

9:35 AM
Characterization of Interfacial Bond Surfaces in Explosively Bonded 304L Stainless Steel: Thomas Ivanoff1; Olivia Underwood1; Jonathan Madison1; Lisa Deibler1; Jeffrey Rodelas2; Sandia National Laboratories

9:55 AM
Surface Tension, Specific Heat and Eutectic Solidification of Substantially Undercooled Liquid Ti-Si Alloy: Kai Zhou1; Bingbo Wei1; Northwestern Polytechnical University

10:15 AM
Magnetic Characterization of CarTech® Hypocore™ Alloy at Cryogenic Temperatures: Vamsi Meka1; Eric Fitterling2; Tanjore Jayaraman1; University of Michigan-Dearborn; Carpenter Technology Corporation

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Analysis of Surfaces and Interfaces

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATeRIALS; Shadia Ikkmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday AM | March 14, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Mingming Zhang, ArcelorMittal; Donato Firrao, Politecnico di Torino

8:30 AM Introductory Comments

8:35 AM Invited
Is the 200 ksi Limit Still Valid for Mechanical Applications of Quenched and Tempered Steels?: Donato Firrao1; PaoloM Mateteis1; Antonio De Sario2; Politecnico Di Torino; VI.MI. Fasteners

8:55 AM Invited
Evolution of Precipitates during Rolling and Annealing Process in Non-oriented Electrical Steel: Qiang Ren1; Lifeng Zhang1; Yan Luo1; Lin Cheng1; Piotr Roman Scheller1; University of Science & Technology Beijing; Shougang Zhixin Qian’an Electromagnetic Materials Co., Ltd.

9:15 AM
Structure and Magnetic Properties of a Medium-entropy Fe46Co34Ni20 Alloy Powder: Anuj Rathi1; Ganesh Varma Thotakura1; Tanjore Jayaraman1; University of Michigan-Dearborn
9:35 AM  Characterization of Water- and Gas- Atomized 17-4 PH Stainless Steel Powder Precursors for Additive Manufacturing: Harish Irrinki\textsuperscript{1}; Satya Ganti\textsuperscript{2}; Rachel Reed\textsuperscript{2}; Veeraraghavan Sundar\textsuperscript{2}; Sundar Atre\textsuperscript{1}; \textsuperscript{1}University of Louisville; \textsuperscript{2}UES Inc

9:55 AM  Break

10:10 AM  Evolution of Microstructure and Mechanical Properties of 20Cr13 under Cavitation Erosion: Guiyan Gao\textsuperscript{1}; \textsuperscript{1}Beihang University

10:30 AM  Fe-Co-2V Soft Ferromagnetic Alloy Characterization and Constitutive Model Development: Kyle Johnson\textsuperscript{1}; Bo Song\textsuperscript{1}; Brett Sanborn\textsuperscript{1}; Jay Carroll\textsuperscript{1}; Don Susan\textsuperscript{1}; Andrew Kustas\textsuperscript{1}; Scott Grutzik\textsuperscript{1}; Adam Brink\textsuperscript{1}; \textsuperscript{1}Sandia National Laboratories

10:50 AM  The Influence of Strain Rate and Temperature on the Shear Response of 1018 Steel: Roberta Beal\textsuperscript{1}; George T. (Rusty) Gray III\textsuperscript{1}; Veronica Livescu\textsuperscript{1}; \textsuperscript{1}Los Alamos National Laboratory

11:10 AM  Investigating the Mechanical Response under Quasi-static Compression of Cold Rolled Lean Duplex Stainless Steel 2101: Tayla Nankivell\textsuperscript{1}; Juan Escobedo-Diaz\textsuperscript{2}; Ali Ameri\textsuperscript{3}; Zakaria Quadir\textsuperscript{2}; Con Logos\textsuperscript{3}; \textsuperscript{1}University of New South Wales; \textsuperscript{2}Curtin University; \textsuperscript{3}Outokumpu

11:30 AM  Exploring Accurate Structure, Composition and Mechanical Properties of Carbides in High Tungsten Iron-base Alloy: High-throughput Mapping and DFT Calculations: Yujie Meng\textsuperscript{1}; Xiaoyu Chong\textsuperscript{2}; Jing Feng\textsuperscript{2}; \textsuperscript{1}Nanomechanics Inc; \textsuperscript{2}Kunming University of Science and Technology

11:50 AM  Preparation of Magnesium Aluminum Ferrite Spinel by Microwave Sintering: Huimin Tang\textsuperscript{1}; Zhiwei Peng\textsuperscript{1}; Foquan Gu\textsuperscript{1}; Lei Ye\textsuperscript{1}; Liancheng Wang\textsuperscript{1}; Leixia Zheng\textsuperscript{2}; Weiguang Tian\textsuperscript{2}; Mingjun Rao\textsuperscript{1}; Guanghui Li\textsuperscript{1}; Tao Jiang\textsuperscript{1}; \textsuperscript{1}Central South University; \textsuperscript{2}Guangdong Guangqing Metal Technology Co. Ltd

(Program continues on next page)
MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Uncertainty Quantification and AI-model Development in Atomistic Simulations

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Liang QI, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

**Thursday AM | March 14, 2019**

**Session Chair:** Xiaofeng Qian, Texas A&M University

**9:00 AM**
Automated Sensitivity Analysis for High-throughput Ab Initio Calculations: Jan Janssen; Tilman Hickel; Joerg Neugebauer; Max-Planck-Institute

**9:20 AM**
Addressing Uncertainty Associated with Classical Interatomic Potential Choice: Lucas Hale; Zachary Trautt; National Institute of Standards and Technology

**9:40 AM**
Modeling Complex Phenomena in 2D Materials Using First-principles Theory Based Machine Learning Force Fields: Yang Yang; Hongxiang Zong; Hua Wang; Xiaodong Ding; Xiaofeng Qian; Texas A&M University; Xi'an Jiaotong University

**10:10 AM** Break

**10:30 AM**
Machine Learning with Force-field Inspired Descriptors for Materials: Fast Screening and Mapping Energy Landscape: Kamal Choudhury; Brian DeCost; Francesca Tavazza; University of Maryland (National Institute of Standards and Technology)

**10:50 AM**
GB Property Localization: Inference and Uncertainty Quantification of GB Structure-property Models from Indirect Polycrystal Measurements: Christian Kurniawan; David Fullwood; Eric Homer; Oliver Johnson; Brigham Young University

**11:10 AM**
Workflow for High-throughput Atomistic Models of Ceramic Interfaces: Shown Coleman; Matthew Guziewski; Caleb Carlin; U.S. Army Research Laboratory

**PHYSICAL METALLURGY**

Computational Thermodynamics and Kinetics — Microstructural Evolution II

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Eminie Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

**Thursday AM | March 14, 2019**

**225C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Mohsen Asle Zaeem, Colorado School of Mines; Patrick Shower, Oak Ridge National Laboratory

**8:30 AM**
Parallel Computing Enhanced Phase-field Method; GPGPU and OpenMP: Kunok Chang; Kyung Hee University

**8:50 AM**
Modeling the Widmanstätten lath Structure in Zr Quenched from the Beta Phase: Richard Smith; Linda Rishel; Naval Nuclear Laboratory

**9:10 AM**
Physics of Point Defects and Defect Clusters in fcc and bcc Metals: Daniel Vizoso; Chaitanya Deo; Remi Dingreville; Georgia Institute of Technology; Sandia National Laboratories

**9:30 AM**
Experimental Investigations and Thermodynamic Modeling of the Al-Cr-Fe System: Maximilian Rank; Peter Franke; Hans J. Seifert; Karlsruhe Institute of Technology

**9:50 AM**
The Effect of Solute Concentration on the Phase Formation in Ni Based Superalloys: You Rao; Maryam Ghazisaeidi; Ohio State University

**PHYSICAL METALLURGY**

Computational Thermodynamics and Kinetics — Nuclear Materials and Radiation Effects

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Eminie Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

**Thursday AM | March 14, 2019**

**301A | Henry B. Gonzalez Convention Center**

**Session Chair:** Andrea Jokisaari, Idaho National Laboratory

**8:30 AM**
Nanoprecipitate Structures in Driven Immiscible Ternary Alloy Systems: Pascal Belloni; Gun Li; Robert Averback; University of Illinois Urbana-Champaign
CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmentally Assisted Cracking in Aluminum Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui. University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srijan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

**Thursday AM | March 14, 2019**

**214C | Henry B. Gonzalez Convention Center**

**Session Chairs:** Nikhilesh Chawla, Arizona State University; Bai Cui, University of Nebraska-Lincoln

8:30 AM Invited

Probing Mechanisms of Corrosion in Aluminum Alloys by Correlative Tomography and Microscopy: Nikhilesh Chawla1; Sridhar Niverty2; Jacob Graber1; Tyler Stannard2; Francesco De Carlo3; Xianghui Xiao1; Vincent De Andrade3; 1Arizona State University; 2Advanced Photon Source

9:10 AM

Degradation and Stress Corrosion Cracking in Highly Sensitized Al-Mg During Overly Cathodic Polarization: Matthew McMahon1; John Scully1; James Burns5; 1University of Virginia

9:30 AM

Nanoscale 4D Microstructural Characterization of Corrosion in Aluminum Alloys using Transmission X-Ray Microscopy (TXM): Sridhar Niverty1; Jacob Graber1; C.Shashank Kaira2; Francesco De Carlo3; 1Arizona State University; 2Argonne National Laboratory

9:50 AM

Direct Evidence of Pit to Crack Transition in Al 7075: Ramasis Goswami1; Attilio Arcari2; 1U.S. Naval Research Laboratory; 2Excet Inc., Corrosion Science and Engineering

10:10 AM Break

10:30 AM Invited

Environmentally Assisted Cracking in Field-retrieved 5XXX Aluminum Alloys: Benjamin Palmer1; John Lewandowski1; 1Case Western Reserve University

10:50 AM

Accounting for Intra-temper Sensitization Variations within 5XXX Series Aluminum Alloys in Predictive Modeling: Matthew Steiner1; Likun Sun1; 1University of Cincinnati

11:10 AM

Role of Mechanical Deformation on the Corrosion Susceptibility of Al7075 Aluminum Alloy: Vikrant Beura1; Chaitanya Kale1; Kiran Solanki1; 1Arizona State University

11:30 AM

Role of Deformation on the Localized Corrosion Behavior of Aluminum 5083 Alloy: Chaitanya Kale1; Vikrant Beura1; Cyril Williams1; Kiran Solanki1; 1Arizona State University; 2U.S. Army Research Laboratory
MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Multi-scale and Multi-physics Models in Fatigue to Better Predict Behavior and Lifetime

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Thursday AM | March 14, 2019

Session Chair: Jean-Briac le Graverend, Texas A&M University

8:30 AM
Micromechanical Modeling of Inclusion Induced Fatigue Damage in High Strength Martenitic Steels: Matti Lindroos1; Anssi Laukkanen1; Tom Andersson1; VTT Research Center of Finland

8:50 AM
A Self-consistent Parametric Homogenization Framework for Fatigue in Ni-based Superalloys: George Weber1; Max Pinz2; Akbar Bagri3; Somnath Ghosh4; Johns Hopkins University

9:10 AM
Atomistic-based Analysis of Fatigue Crack Propagation Mechanisms in FCC Metals: Eyouiléki Awi1; Maxime Sauzay2; Laurent Van Brutzel2; Zhengxuan Fan2; Olivier Hardouin Duparc2; The French Atomic Energy and Alternative Energies Commission; 1ONERA, The French Aerospace Laboratory; 2Ecole Polytechnique Fédérale de Lausanne

9:30 AM Invited
Simulation of Fatigue Crack Propagation in Complex Al2024T351 Structures: Henry Proudhon1; Raphaël Cusset2; Marta Dragon-Louiset1; Vincent Jacques1; Laura Bonne1; Farida Azzouz2; Jacques Besson1; Mines ParisTech Centre Des Materiaux; 1Dassault Aviation

9:50 AM Break

10:10 AM
A Multi-scale Model for Fatigue Crack Initiation in Polycrystalline Titanium Alloys: Shravan Kotha1; Oztukr Deniz2; Adam Pilchak2; Somnath Ghosh1; Johns Hopkins University; 1Air Force Research Laboratory

10:30 AM
The Deformation Behaviors of Commercially Pure Titanium Grade 1 and Grade 2 Sheets under Monotonic and Cyclic Loading: Chao Ma1; Peidong Wu2; Takayuki Hama3; Xiaoqian Guo4; Xianbiao Mao5; Huamiao Wang6; 1McMaster University; 2China University of Mining and Technology; 3McMaster University; 4Kyoto University; 5Shanghai Jiao Tong University; 6University of Utah

10:50 AM
Finding the Physical Basis for Fatigue Crack Growth: Accounting of Mean Stress Effects through the Concept of Change in Net-section Strain Energy: K. S. Ravi Chandran1; 1University of Utah

11:10 AM
Verification & Validation of Computational Models Associated with the Mechanics of Materials: George Spona1; Steve WaiChing Sun2; The Minerals, Metals & Materials Society (TMS); 1Columbia University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Local Fracture Processes: Insights from Experiments and Modeling

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill. Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Thursday AM | March 14, 2019

217B | Henry B. Gonzalez Convention Center

Session Chair: Daniel Kiener, Montanuniversität Leoben; Bernhard Völker, Max-Planck-Institut für Eisenforschung

8:30 AM Invited
Improving Mechanical Properties of Mixed Transition Metal Carbide Reinforcements in Steel: Lionel Michele1; Marta Fornabiao1; Goran Zagar2; Lea Deilon1; Andreas Mortensen1; 1Ecole Polytechnique Fédérale de Lausanne

8:50 AM
Designing New Hard Coating Material Systems Utilizing AB Initio DFT Calculations: Bernhard Völker1; Rafael Soler2; Stefan Gleich3; Jan-Ole Achenbach3; Christoph Kirchlechner3; Christina Scheu3; Gerhard Dehm3; Jochen M. Schneider4; 1RWTH Aachen University; 2Max-Planck-Institut für Eisenforschung GmbH; 3Materials Chemistry, RWTH Aachen University

9:30 AM Using the Steady-state Work Density Gradient Crack Tip Parameter to Characterize Steady State Crack Growth in Metal Thin Films: Wade Lanning1; Syed Javaid1; Christoper Muhlstein1; 1Georgia Institute of Technology

9:50 AM
Size Dependent Fracture Behaviors of Metallic Glass Nanolaminates: Xinghang Zhang1; Zhe Fan2; Jian Wang3; 1Purdue University; 2Oak Ridge National Laboratory; 3University of Nebraska, Lincoln

10:10 AM Break

10:30 AM Invited
In Situ Transmission Electron Microscopy Observation on Fracture Process of High Entropy Alloys: Qian Yu1; Qiaoqian Fu2; Robert Ritchie3; Bernd Glodovatz4; Easo George5; 1Zhejiang University; 2Lawrence Berkeley National Laboratory; 3Oak Ridge National Laboratory

10:50 AM
Interface Control of Fracture in Multilayer Films: Cynthia Vollert1; 1University of Gottingen

11:10 AM
In Situ TEM on Crack Growth and Dislocation Shielding in Metallic Thin Foils: Scott Mao2; 1University of Pittsburgh
11:30 AM
Unravelling the Role of Interfaces on the Shock Response of Nanocrystalline Cu/Ta alloys. Jie Chen¹, Avinash Dongare²; ¹University of Connecticut

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Derivative Technologies

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday AM | March 14, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Kenneth Ross, Pacific Northwest National Laboratory; Jonathan Martin, TWI Ltd.

8:30 AM Invited
Assessing the Performance of Aluminum Alloy Heat Exchangers Manufactured by Stationary Shoulder Friction Stir Channeling: Joao Gandra¹; ¹TWI, Ltd.

8:50 AM
Copper-graphite Composite Wire Made by Shear-assisted Processing and Extrusion: Xiao Li¹, Glenn Grant¹; Chen Zhou²; Hongliang Wang³; Thomas Perry³; James Schroth⁴; ¹Pacific Northwest National Laboratory; ²General Motors

9:10 AM
Joining AA7099 to Ni-Cr-Mo Steel Using Friction Stir Dovetailing: Md. Reza-E-Rabby¹; Dustin Avery¹; Brian Jordan¹; ¹University of Alabama

9:50 AM Break

10:10 AM
Fatigue Behavior of Friction Stir Welding and Additive Friction Stir Deposition Repair Methods for Aluminum Alloys: Conner Cleeth¹; Dustin Avery¹; Brian Jordan¹; Paul Allison¹; ¹University of Alabama

10:30 AM Invited
Material Flow and Microstructure Evolution in Corner Friction Stir Welding of 5083 Al Alloy using Ad-stir Technique: Kunitaka Masahiko¹; Hiroshi Saito¹; Koji Nezaki¹; Shoko Kitamoto¹; Yutaka Sato²; Hiroyuki Kokawa³; ¹HI Corporation; ²Tohoku University

10:50 AM
Additive Friction Stir Deposition of Metals and Composites: Hang Yu¹; ¹Virginia Polytechnic Institute

11:10 AM
Joining of Lightweight Dissimilar Materials by Friction Self-pierce Riveting: Yong Chae Lim¹; Charles Warren¹; Jian Chen¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

8:30 AM Invited
Use of the TPM Model to Illuminate Differences between Conventional and Stationary Shoulder FSW: Tony Reynolds¹; ¹University of South Carolina

8:50 AM
Numerical Model to Estimate Tool Wear and Worn-out Pin Shape during Friction Stir Welding of CuCrZr Alloy: Pankaj Sahlot¹; Amit Arora¹; ¹PDPU Gandhinagar, INDIA and IIT Gandhinagar; ²IIT Gandhinagar

9:10 AM Invited
Probing Tool Durability in Stationary Shoulder Friction Stir Welding: Buchibabu Vicharapu¹; Huihong Liu²; Hidetoshi Fujii³; Ninshu Ma³; Amitava De²; ¹Osaka University, ²Indian Institute of Technology Bombay

9:30 AM Invited
On the Material Bonding Behaviors in Friction Stir Welding: Gaoqiang Chen¹; Han Li¹; Qingyu Shi¹; ¹Tsinghua University

9:50 AM Break

10:10 AM Invited
Mechanical Characterization of the Interface Obtained in Friction-stir-welded Joints using Cohesive Zone Modeling: Varun Gupta¹; Erin Barker¹; Piyush Upadhyay³; Darrell Herling³; ¹Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

10:30 AM
Investigation of Interfacial Diffusion during Dissimilar Friction Stir Welding: Nikhil Gotaonkar¹; Amber Shrivastava¹; ¹Indian Institute of Technology, Bombay

10:50 AM
Effect of Actual Thermo-physical Properties on Heat Transfer and Material Flow for Dissimilar Weld – Al 6061-T6 and AZ31: Amit Singh¹; Pankaj Sahlot¹; Amit Arora¹; ¹Indian Institute of Technology, Gandhinagar

11:10 AM
Probing Texture Evolutions during Friction Stir Processing of a Mg Alloy: In Situ, Real-time Neutron Diffraction Study: Yuan Li¹; Ke An²; Zhili Feng²; Hahn Choo¹; ¹University of Tennessee; ²Oak Ridge National Laboratory
THURSDAY AM

TMS2019 TECHNICAL PROGRAM

ADDITIONAL MATERIALS

High Entropy Alloys VII — Alloy Development and Applications III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday AM | March 14, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Jim Hu, Honda R&D Americas, Inc.; Hyoung Kim, POSTECH

8:30 AM Invited
Design of High-strength High-entropy Alloys: Hyoung Seop Kim1; Jongun Moon2; Jae Wung Bae3; Jeong Min Park1. 1Postech

8:50 AM Invited
Efficient Exploration of the High Entropy Alloy Composition-phase Space: Raymundo Arroyave1; Anas Abu-Odeh2; Tanner Kirk3; Richard Malak4; 1Texas A & M University; 2University of California-Berkeley

9:10 AM Invited
Fcc/B2 Precipitation Hardenable AlXCoCrFeNi High Entropy Alloy Microstructures: Single Phase Fcc vs. Dual Phase Fcc-bcc: Bharat Gwalani1; Sridhura Gangireddy1; Deep Choudhuri1; Rajiv S Mishra1; Rajarshi Banerjee1. 1University of North Texas

9:30 AM Invited
Development of Oxide-dissipation Strengthening Medium Entropy Alloy: Bin Li1; Yong Liu1; Ao Fu2; Yong Yang3; Qigong Fang4; 1Central South University; 2City University of Hongkong; 3HUNAN University

9:50 AM Break

10:10 AM Invited
Development of Oxidation Resistant Refractory High Entropy Alloys for High Temperature Structural Applications: Bronislava Gorr1; Franz Mueller1; Steven Schellert1; Hans Christ1; Hans Chen1; Alexander Kaufmann1; Martin Heilmair1; 1University of Siegen; 2Karlsruhe Institut fuer Technologie (KIT)

10:30 AM Invited
Hierarchical Microstructure and Mechanism of Strengthening of a CoCrFeNiMn High Entropy Alloy Additively Manufactured by Selective Laser Melting: Zhiguang Zhu1; Quy-bau Nguyen1; Peter K. Liaw2; Mui-ling Nai1; Jun Wei3; 1Singapore Institute of Manufacturing Technology; 2The University of Tennessee

10:50 AM
Production of AlCoCrFeNiMn Based High Entropy Alloys via Self Propagating High Temperature Synthesis: Murat Altan1; Esra Dokumaci1; Berkay Turkoglu1; Aslihan Kara1; Busra Aksu1; Dilan Ugurluer1. 1DEU

11:10 AM
Synthesis and Characterization of Nanocrystalline Fe26.7Co26.67Ni26.67Al10Si10 Alloy Powders: Katherm Bazzi1; Anuj Rathi1; Vamsi Meka1; Ramasis Goswami1; Tanjore Jayaraman1. 1University of Michigan-Dearborn; 2Naval Research Laboratory

11:30 AM
Effect of Al and Si Additions on the Microstructure Evolution during Thermomechanical Treatments of the Equimolar CoCrFeMnNi Alloy: Dorian Hachet1; Stephane Gorsse2; Stephane Godet2. 1Universite Libre de Bruxelles; 2CNRS, Univ. Bordeaux, ICMCB
Deformation Modes and Strength-ductility Combination of FCC-structured High-entropy Alloys: Jian Wang; Kaisheng Ming; 
1University of Nebraska–Lincoln; 2Beihang University

11:10 AM Invited
Nuclear and Magnetic Phase Stability of FCC-to-HCP Transformation-induced Plasticity High Entropy Alloy and Its Effect on Work-hardening Behavior: Sichao Fu; Hongbin Bei; Tao Zou; Zheng Gai; Tingkun Liu; Dunji Yu; Yan Chen; Ke An; 1Oak Ridge National Laboratory

11:30 AM
Size-affected Plasticity in Eutectic High Entropy Alloy Nanocomposite: Zhaoyi Ding; Q. He; D. Chung; Q. Wang; Y. Yang; 
1City University of Hong Kong; 2City University of Hong Kong/ Shanghai University

ADVANCED MATERIALS
High Entropy Alloys VII — Structures and Mechanical Properties IV

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday AM | March 14, 2019
008B | Henry B. Gonzalez Convention Center

Session Chairs: Paul Jablonski, National Energy Technology Laboratory; Rajarshi Banerjee, University of North Texas

8:30 AM Invited
Ultra-high Strength and Anomalous Hardening in FCC Medium / High Entropy Alloys: Connor Stone; Jiashi Mao; Easo George; Michael Mills; 1Ohio State University

8:50 AM Invited
Size Effect and Strain-rate Sensitivity of Fcc Alloys – From Single Elements to High Entropy: Yuan Xiao; Ralph Spolenak; Jeffrey Wheeler; 1ETH Zurich

9:10 AM
Effect of Annealing on Microstructural and Mechanical Properties of AlNi4-Hf-Sc-Ti-Zr High Entropy Alloy: Lukasz Rogal; Piotr Bobrowski; Fritz Körmann; Blazej Grabowski; 1Institute of Metallurgy And Materials Science

9:30 AM Invited
Microstructure and Mechanical Properties of High-entropy Alloy Co20Cr26Fe20Mn20Ni14 Processed by High-pressure Torsion at 77 K and 300 K: Jongun Moon; Yuanshen Qi; Elena Tabachnikova; Yuri Estrin; Soo-Hyun Joo; Hyoung Seop Kim; 1POSTECH; 2Technion – Israel Institute of Technology; 3B. Verkin Institute for Low Temperature Physics and Engineering of National Academy of Sciences of Ukraine; 4Monash University; 5Tohoku University

9:50 AM Invited
Strain-rate Effect on the Tensile Behavior of CoCrFeNi and CoCrFeMnNi High Entropy Alloys: Mitra Shabani; Joseph Indeck; Garrett Pataky; Kavan Hazeli; Paul Jablonski; 1Clemson University; 2University of Alabama - Huntsville; 3National Energy Technology Laboratory

10:10 AM Break

10:30 AM Invited
Thermomechanical Processing to Achieve High Strength in an FCC Based High Entropy Alloy via L12 Precipitation: Sriswaroop Dasari; Bharat Gwalani; Vishal Soni; Abhinav Jagetia; Rajarshi Banerjee; 1University of North Texas

10:50 AM Invited
Microstructural Refinement and Deformation Twinning during Equal Channel Angular Extrusion of Equiatomic CoCrFeMnNi HEA at Elevated Temperatures: Sezer Picak; Havva Cansu Yilmaz; Yuri I. Chumilyakov; Ibrahim Karaman; 1Department of Mechanical Engineering, Texas A&M University; 2Department of Materials Science and Engineering, Texas A&M University; 3Tomsk State University, Siberian Physical Technical Institute

11:10 AM Invited
Laser Processing as a High-throughput Method to Investigate Microstructure-processing Relationships in a High Entropy Alloy: Mu Li; Rohan Mishra; Katharine Flores; 1Washington University in St Louis

MATERIALS DESIGN
ICME Education in Materials Science and Mechanical Engineering — ICME Education in Materials Science and Mechanical Engineering

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Education Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Alloy Phases Committee

Program Organizers: Wei Xiong, University of Pittsburgh; Michele Manuel, University of Florida; Danielle Cote, Worcester Polytechnic Institute; Mohsen Asle Zaeem, Colorado School of Mines; Krista Limmer, US Army Research Laboratory

Thursday AM | March 14, 2019
304A | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Krista Limmer, US Army Research Laboratory; Michele Manuel, University of Florida; Danielle Cote, Worcester Polytechnic Institute; Alexis Lewis, National Science Foundation

8:30 AM Invited
Education in Computational Thermodynamics, ICME and Materials Design – The KTH Experience: John Agren; 1Royal Institute of Technology

8:50 AM Invited
Opportunities and Challenges for Implementing ICME in University Education: David McDowell; 1Georgia Institute of Technology

9:10 AM Invited
Cross Society Integration of ICME within the Digital Engineering Paradigm of Aerospace Engineering: Michael Sangid; John Matlik; Ben Thacker; Charles Ward; Mat French; Sankaran Mahadevan; Nathan Hartman; 1Purdue University; 2Rolls-Royce Corporation; 3Southwest Research Institute; 4Air Force Research Laboratory; 5Vanderbilt University

9:30 AM Invited
Perspectives on ICME Education from a Converted Empiricist: William Hamm; 1Materials Design
9:50 AM Invited
Computational Materials Science and Engineering Education: Present and Future: Raul Enrique1; Mark Asta2; Katsuyo Thornton3; 1University of Michigan; 2University of California, Berkeley
10:10 AM Break
10:25 AM Invited
Education of Thermodynamics, CALPHAD, and ICME: Zi-Kui Liu4; 1Pennsylvania State University
10:45 AM Invited
ICME Applied in the Undergraduate Capstone Senior Design Sequence: Paul Sanders5; 1Michigan Technological University
11:05 AM Invited
Integrating Computational Materials Engineering into the Curriculum - Challenges and Options: Vilupanur Ravi6; 1Cal Poly Pomona
11:25 AM Invited
ICME Education at Northwestern: Greg Olson7; 1Northwestern University & QuesTek Innovations LLC
11:45 AM Panel Discussion Coordinated by Dr. Alexis Lewis

CHARACTERIZATION
Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Interface-defect Interactions
Sponsored by: The Minerals, Metals and Materials Society, TMS; Computational Materials Science and Engineering Committee
Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley
Thursday AM | March 14, 2019
302C | Henry B. Gonzalez Convention Center
Session Chairs: Mitra Taheri, Drexel University; Garritt Tucker, Colorado School of Mines

8:30 AM Invited
Correlative Studies of Segregation at Grain Boundaries and Heterophase Interfaces at an Atomic Scale: David Seidman8; 1Northwestern University
9:00 AM
Modelling of Equilibrium and Non Equilibrium Boron Segregation at Austenitic Grain Boundaries: Frederic Danoi9; Nicolas Rolland10; Claire Debreux10; Thomas Sourmail10; Simon Cattseau10; Didier Blavette10; 1Cnrs - Universite De Normandie Rouen; 2UNIROUEN; 3Ascometal
9:20 AM
Solute Effects on Twin Nucleation and Growth in Ti alloys: Mohammad Shahriar Hooshmand10; Maryam Ghazisaeidi10; 1Ohio State University
9:40 AM Invited
Loss of Stability in Nanocrystalline Alloys by Grain Boundary Desegregation: Christopher Schuh11; Dor Amram11; Zengbao Jiao11; Wenting Xing11; Malik Wagih11; 1Massachusetts Institute of Technology

10:10 AM Break
10:30 AM Invited
Defect Interactions with Semi-coherent Interfaces in Ionic Materials: Blas Uberuaga12; Pratik Dholabhai12; Enrique Martinez12; Kedarnath Kolluri12; Xiang-Yang Liu12; 1Los Alamos National Laboratory; 2Rochester Institute of Technology
11:00 AM
Effect of Zn and H on Grain Boundary Embrittlement in Al: Oleg Kontsevoi13; Gregory Olson13; 1Northwestern University
11:20 AM
Nonequilibrium Molecular Dynamics Simulations of Ejecta Formation in Helium-implanted Copper: Rachel Flanagan14; Saryu Fensin14; Timothy Germann14; Marc Meyers15; 1University Of California, San Diego; 2Los Alamos National Laboratory
11:40 AM
The Role of Nb3Sn/Nb Interface on Microstructural Defects in Nb3Sn Coatings on Nb for Superconducting Radiofrequency Cavities: Jaeyel Lee16; Sam Posen16; Zugang Mao16; Yulia Trenikhina16; Kai He16; Daniel Hall16; Matthias Liepe17; David Seidman18; 1Northwestern University; 2Fermi National Accelerator Laboratory; 3Cornell University

SPECIAL TOPICS
International Round Table on Materials Criticality — How Industry Manages Criticality
Sponsored by: ESM Foundation; co-sponsored by: The Federation of European Materials Societies
Program Organizer: Alessandra Hool, ESM Foundation
Thursday AM | March 14, 2019
007C | Henry B. Gonzalez Convention Center
Session Chair: Alessandra Hool, ESM Foundation

8:30 AM Introductory Comments
Invited speakers include:
Roderick Eggert, Colorado School of Mines and the Critical Materials Institute
James Robert Goddin, Granta Design Ltd.
Atsufumi Hirohata, University of York
Christina Meskers, Umicore
David Jarvis, HipTec AS
Nikolaos Michailidis, Aristotle University of Thessaloniki
Min-Ha Lee, Korea Institute of Industrial Technology
Armin Reller, ESM Foundation
Steven Young, University of Waterloo
NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Multicomponent Alloys and Advanced Characterization Techniques

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Moshen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Thursday AM | March 14, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organisation; Kester Clarke, Colorado School of Mines

8:30 AM Invited
Irradiation Effects on Precipitation in Multiconstituent Steels: G. Robert Odette1; Nathan Almirall2; Peter Wells3; Takuya Yamamoto3; Emmanuelle Marquis3; Shipeng Shu4; Dan Morgan5; Jia-Hong Ke6; Huilin Ke7; University of California Santa Barbara; 8University of Michigan; University of Wisconsin-Madison; Oregon State University; Ohio State University

8:55 AM
Irradiation Responses of Al0.3CoCrFeNi High Entropy Alloy at Elevated Temperatures: Tengfei Yang1; Wei Guo2; Jonathan Poplawsky2; Dongyue Li3; Ling Wang4; Yao Li5; Zhanfeng Yan6; Yong Zhang7; Yugang Wang8; Steven Zinkle9; Department of Nuclear Engineering, University of Tennessee; 1Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; 2State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing; 3State Key Laboratory of Nuclear Physics and Technology, Center for Applied Physics and Technology, Peking University; 4Department of Nuclear Engineering, University of Tennessee, Knoxville

9:15 AM
Comparing Tensile and Irradiation Effects in High Entropy Alloys and 316H Stainless Steel: Wei-Ying Chen1; Yiren Chen1; Naoyuki Hashimoto2; Jonathan Poplawsky3; Xiang Liu4; Jien-Wei Yeh5; Wei Guo6; Ko-Kai Tseng7; Krishnamurti Natesan1; Argonne National Laboratory; 2Hokkaido University; 3Oak Ridge National Laboratory; 4Idaho National Laboratory; 5National Tsing Hua University

9:35 AM
High Irradiation Resistance and Elemental Segregation in Nanocrystalline W-based Refractory High Entropy Alloy: Osman El-Atwani1; Meimei Li2; Nan Li3; Arun Devaraj4; Duc Nguyen-Manh5; Stuart Maloy6; Enrique Martinez7; Matthew Schneider8; Los Alamos National Lab; 1Argonne National Laboratory; 2Pacific Northwest National Laboratory; 3United Kingdom Atomic Energy Authority

9:55 AM AM Break

10:15 AM Invited
Using Advanced Microscopy Methods to Understand Phase Transformations in Irradiated Materials: Philip Edmondson1; Oak Ridge National Laboratory

10:40 AM
Irradiation Assisted Strain-induced Phase Transformation in Neutron Irradiated Austenitic 304L Stainless Steel Laser Weldments: Keyou Mao1; Cheng Sun2; Paula Freyer3; Frank Garner4; Janelle Wharry5; Purdue University; 1Idaho National Laboratory; 2Westinghouse Electric Company LLC; 3Texas A&M University

11:00 AM
In-situ X-ray Study of the Deformation Wave Phenomenon in a Neutron-irradiated 316 Stainless Steel: Xuan Zhang1; Meimei Li2; Chi Xu3; Yiren Chen4; Jun-Sang Park5; Jonathan Almer6; Argonne National Laboratory; 1University of Florida

11:20 AM
In-Situ TEM Studies on the Stability of Nanotwinned Metals and Alloys under Irradiation at Elevated Temperature: Cuncui Fan1; Jin Li2; Zhongxia Shang3; Youxue Chen3; Sichuang Xue4; Haiyan Wang4; Xinghang Zhang5; Purdue University; University of Minnesota

11:40 AM
Microstructural and Mechanical Properties of Crystalline Materials Containing He-bubble Superlattice: Miroslav Popovic1; Mehdi Balooch2; Peter Hosemann3; University of California Berkeley

LIGHT METALS

Magnesium Technology 2019 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, Texture and Fatigue II

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Thursday AM | March 14, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: Chamini Mendis, Brunel University; Domonkos Tolnai, Helmholtz-Zentrum Geesthacht

8:30 AM
Recent Progress in Development and Applications of Mg Alloy Thermodynamic Database: Rainer Schmid-Fetzer1; Claustral University of Technology

8:50 AM
Hardening Effects of Precipitates with Different Shapes on the Twinning in Magnesium Alloys: Haidong Fan2; Jaafar El-Awady3; Dierk Raabe4; 1Max-Planck-Institut für Eisenforschung; 2Johns Hopkins University

9:10 AM
Isometric Tilt Grain Boundaries and Solute Segregation in a Deformed Mg-Zn-Ca Alloy: Yuman Zhu1; Jian-Feng Nie2; Monash University

9:30 AM
Metallography of Mg Alloys: Norbert Hort1; Victor Floss2; Sarkis Gavas3; Gert Wiese3; Domonkos Tolnai4; Helmholtz-Zentrum Geesthacht; Helmut Schmidt University

9:50 AM
Microstructural and Mechanical Properties of High Shear Material Deposition of Rare Earth Magnesium Alloy WE43: Zack McClelland1; Dustin Avery2; C.J.T. Mason2; Oscar Rivera3; Chris Leah1; Paul Allison4; J.B. Jordan5; R.L. Martens6; Nanci Hardwick7; 1US Army ERDC; 2The University of Alabama; 3MELD Manufacturing

10:10 AM Break

10:30 AM
Modeling the 3D Plastic Anisotropy of a Magnesium Alloy Processed Using Severe Plastic Deformation: Joshua Herrington1; Yazid Madi2; Jacques Besson3; Amine Benzerga4; Texas A&M University; 1Mines ParisTech & EPF; 2Mines ParisTech; 3University of California Santa Barbara; 4Oak Ridge National Laboratory; 5Los Alamos National Laboratory; 6University of Wisconsin-Madison; 7University of California Berkeley
10:50 AM
Multiaxial Cyclic Response of Low Temperature Closed-die Forged AZ31B Mg Alloy: Dwayne Toscano; Sughir Shahri; Seyed Behravesh; Bruce Williams; Hamid Jahed; 1University of Waterloo; 2CarnegieMATERIALS

11:30 AM
Unveiling the Role of Super-jogs and Dislocation Induced Atomic-shuffling on Controlling Plasticity in Magnesium: Kinshuk Srivastava; Satish Rao; Jadfar El-Awady; 1Johns Hopkins University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Defect Evolution II

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Alkhalfiyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Thursday AM | March 14, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Laurent Capolungo, Los Alamos National Laboratory; Phil Edmondson, Oak Ridge National Laboratory

8:30 AM Invited
Effects of Irradiation on the Kinetics of Precipitation in Fe-Cr-C Alloys: Frederic Soisson; Estelle Meslin; Olivier Tissot; 1Cea Saclay

9:00 AM
Investigation of Radiation Temperature and Straining Temperature Effects on the Screw Dislocation Mobility Evolution in Irradiated Ferritic Grains Using 3D Dislocation Dynamics: Yang Li; Christian Robertson; Xiannfeng Ma; Biao Wang; 1DEN-Serve de Recherches Metallurgiques Appliquees, CEA, Universite Paris-Saclay; 2Sino-French Institute of Nuclear Engineering and Technology, Sun Yat-sen University

9:20 AM
Property-property Correlations of Tensile, Shear-punch, Hardness Measurements and Microstructure Property Relations from the UCSB ATR2 Experiment Database: Takuya Yamamoto; Nathan Almirall; Peter Wells; Kirk Fields; David Gragg; G. Robert Odette; 1University of California Santa Barbara

9:40 AM
Radiation Effects on HT9 Tempered Martensitic Steels as a Function of Nitrogen Content and Deformation: Eda Aydogan; Bjorn Clausen; Donald Brown; Matthew Chancey; Yongqiang Wang; Daniel Coughlin; Cody Miller; Stuart Maloy; 1Los Alamos National Laboratory

10:00 AM Break

10:20 AM Invited
The Role of Non-equilibrium Grain Boundary Structure in Radiation Tolerance and Thermal Stability: Mitra Taheri; 1Drexel University

10:50 AM
The Effect of Grain Boundaries and Second-phase Particles on Notch-tip Hydride Reorientation in Zirconium Alloys: Said El Chamaa; Mark Wenman; Catrin Davies; 1Imperial College London

11:10 AM
Strength and Ductility Enhancement of T91 Ferritic-Martensitic Steel by Partial Tempering Treatment: Zhongxia Shang; Jie Ding; Cuncai Fan; Miao Song; Jin Li; Qiang Li; Sichuang Xue; Karl Hartwig; Xinghang Zhang; 1Purdue University; 2University of Michigan; 3Texas A&M University

11:30 AM
Thermal and Irradiation Climb in Discrete Dislocation Dynamics: Aaron Kohner; Laurent Capolungo; 1Los Alamos National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocomposites I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lileeoden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Thursday AM | March 14, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Nikhilesh Chawla, Arizona State University; Nathan Mara, University of Minnesota

8:30 AM
Shock Response of Cu/Ta Multilayered Systems at the Atomic Scales: Jie Chen; Suveen Mathaudhu; Naresh Thadhan; Avinash Dongare; 1University of Connecticut; 2University of California, Riverside; 3Georgia Institute of Technology

8:50 AM
Mechanical Properties of Amorphous Silicon Nanoparticles: Dimitrios Kilymis; Celine Gerard; Laurent Pizzagalli; 1Institut Pprime - Cnrs

9:10 AM Invited
Recent Developments in Micromechanical Analysis of Nanostructured Materials: Low Temperatures, High Strain Rates, and Novel Sample Geometries: Jakob Schwiedrzik; 1Empa

9:40 AM
The Effect of Coherent Interface on Strain-rate Sensitivity of Cu-based Nanolayers: Kunming Yang; Yue Lu; Engang Fu; Xinghang Zhang; 1Shanghai Jiao Tong University; 2Peking University; 3Purdue University

10:00 AM Break

10:20 AM Invited

10:50 AM
Deformation Behavior of Nanolayered Metal-Ceramic Composites under Tensile Loading: Microstructural and Size Effects: Somya Singh; R. Berlia; L.W. Yang; A.J. Palomares; J. Llorca; K. Baldwin; N. Mara; J. Rajagopalan; J.M. Molina-Aldareguia; 1Arizona State University; 2IMDEA Materials Institute; 3Los Alamos National laboratory; 4University of Minnesota
11:10 AM
The Role of 3D Interface Structure in Plastic Deformation of Cu/Nb Nanocomposites: Younghoon Cho; Justin Cheng; Jon Baldwin; Nan Li; Jason Myers; Richard Hoagland; Xiang-Yang Liu; Nathan Mara; University of Minnesota; Los Alamos National Laboratory

11:30 AM Invited
Identifying Deformation and Fracture Processes in Interface-dominated Materials: Daniel Kienert; Inas Issa; Markus Alfreider; Michael Wurmshuber; Otmar Kolednik; Verena Maier-Kiener; University of Leoben; Austrian Academy of Sciences

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Synthesis

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS. Mechanical Behavior of Materials Committee

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Thursday AM | March 14, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Tomoyuki Homma, Nagaoka University of Technology; Klaus-Dieter Liss. Guangdong Technion - Israel Institute of Technology (GTIIT)

8:30 AM Invited
Hierarchical Bulk Nanoporous Aluminum for On-board Hydrogen Generation by Hydrolysis: Eric Detsi; John Corsi; Jintao Fu; Zeyu Wang; University of Pennsylvania

9:00 AM
Synthesis of Mesoporous Copper Oxide (CuO) using Inverse Micelle Method for Non-enzymatic Biosensors: Sung Gue Heo; Won-Sik Yang; Kyoung-Tae Park; Taek-Soo Kim; Kyoung Mook Lim; Soong Ju Oh; Seok-Jun Seo; Korea Institute of Industrial Technology; Korea University

9:20 AM
Fabrication of Np Metals using Thermal Dealloying in Vacuum: Maria Kosmidou; Tyler Maxwell; Michael Detisch; Nicolas Briot; T. John Balk; University of Kentucky

9:40 AM Invited
Processing and Mechanical Performance of Carbon-based Nanoarchitected Materials: Lorenzo Valdevit; University of California, Irvine

10:10 AM Break

10:40 AM
PH-Controlled Dealloying Route to Hierarchical Bulk Nanoporous Zn Derived from Metastable Alloy for Hydrogen Generation by Hydrolysis of Zn in Neutral Water: Jintao Fu; Eric Detsi; University of Pennsylvania

11:00 AM
Magic Oxygen in Metallic Glasses: Tuning Cu-Ag Porous Nanomembrane into Nanoporous Ag-Cu@Ag Core-shell Alloy: Xue Liu; Ke-Fu Yao; Institute of Materials, China Academy of Engineering Physics; Tsinghua University

11:20 AM
Nanoporous Au by Free-corrosion Dealloying in Water: Heng Wei; Zeyu Wang; Jintao Fu; Eric Detsi; University of Pennsylvania

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys IV

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas. Klaus-Dieter Liss. Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhril Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Thursday AM | March 14, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Tomoyuki Homma, Nagaoka University of Technology; Klaus-Dieter Liss. Guangdong Technion - Israel Institute of Technology (GTIIT)

8:30 AM
Phase Transformations and Evolution of Rapid Solidification Microstructures in Al-Cu Alloys during Sequences of Laser-induced Rapid Thermal Transients: Vishwanath Bathula; Jorg Wiezorek; Joseph McKeown; University of Pittsburgh; Lawrence Livermore National Laboratory

8:50 AM
Exploring Phase Transformations in the Au-Zn-Al System: Taylor Jacobs; Seth Imhoff; Sven Vogel; Mark Ortega; Chris Baxter; Eunice Solis; Sendin Bajric; Carlos Archuleta; Meghan Gibbs; Clarissa Yablinsky; Los Alamos National Laboratory

9:10 AM
Enhanced Athermal e-Martensite in Co-Cr Alloys under Rapid Solidification Conditions: Hugo Lopez; Ana Ramirez-Ledesma; Julio Juarez-Islas; University of Wisconsin; Universidad Autónoma de México

9:30 AM
Thermo-mechanical Property Design through Computational Modeling for Advanced Powder Metallurgy: Dereh Tsalnopoulos; Bryer Sousa; Danielle Cote; Victor Champagne; Worcester Polytechnic Institute; U.S. Army Research Laboratory

9:50 AM
Superelasticity and Superplasticity in Shape Memory Yttria Stabilized Tetragonal Zirconia Nanoparticles: Ning Zhang; Mohsen Asle Zaeem; Colorado School of Mines

10:10 AM Break

10:30 AM
Order-disorder Morphologies in Rapidly Solidified Ni,Ge Intermetallic: Nafisul Haque; Robert Cochrane; Andrew Mullis; University of Leeds

10:50 AM
Superplastic Behavior of a Modified 3000 Series Aluminum Alloy: Francisco Flores; Davaadorj Bayansan; David Seidman; David Dunand; Nhon Vo; NanoAl LLC; Northwestern University

11:10 AM
Precipitation Hardening of Supersaturated Al-Sc-Zr Produced via Melt-Spinning: Yang Yang; Paul Sanders; Michigan Technological University
11:30 AM
Microstructural and Mechanical Property of Ti - STS Dissimilar Joints by Brazing with Zr-Ti Metallic Glass Filler and Intermediate Layers: Jin Soo Park; Da Hye Song; Jin Kyu Lee; Kongju National University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Structural Evolution and Thermal Stability

Sponsored by: TMS: Powder Materials Committee
Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Thursday AM | March 14, 2019
211 | Henry B. Gonzalez Convention Center
Session Chair: To Be Announced

8:30 AM
Structural Evolution in Fe-Cr alloys – The Effect of Processing: Lukas Weissitsch; Martin Stückler; Stefan Wurster; Andrea Bachmaier; Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences

8:50 AM
Thermal Stability Facilitated by Diamantane on Triple Junctions in Bulk Nanocrystalline Aluminum Alloys: James Earthman; Ali Yousefian; Torben Boll; Martin Heilmaier; University of California, Irvine; Boeing Research & Technology; Karlsruhe Institute of Technology

9:00 AM
Influences ofInterstitial and Extrusion Temperature on Grain Boundary Segregation, Y-Ti-O Nanofeatures, and Mechanical Properties of Ferritic Steels: Sierros Sierros; Maria Torres Arango; Ruipeng Li; Gregory Doerk; Lutz Wiegart; Brookhaven National Laboratory

9:30 AM
Effect of Rare Earth Oxides on the Microstructure and Mechanical Behavior of Fe-Based Alloys Processed via Spark Plasma Sintering: Arnab Kundu; Indrajit Chari; Brian Jacques; Chao Jiang; University of Idaho; Boise State University; Idaho National Laboratory

9:50 AM Break

10:10 AM
High Magnetic Properties of Nd-Fe-B Sintered Magnets using Multiple Sintering Process: Dongwon Shin; Soon Jik Hong; Dong Su Kim; Kongju National University

10:30 AM
Numerical Simulation and Validation of Gas and Molten Metal Flows in Close-coupled Gas Atomization: Franz Hernandez; Bo Kong; Trevor Riedemann; Jordan Tiarks; Jonathan Regele; Thomas Ward; Iver Anderson; Ames Laboratory of US DOE; Los Alamos National Laboratory; Iowa State University

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics II: Functional Materials and Devices

Sponsored by: TMS: Thin Films and Interfaces Committee
Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierrros, West Virginia University; Wenchao Zhou, University of Arkansas

Thursday AM | March 14, 2019
217D | Henry B. Gonzalez Convention Center
Session Chairs: Wenchao Zhou, University of Arkansas; Tolga Aytug, Oak Ridge National Laboratory

8:30 AM Invited
Direct-write Flexible Sensors for Energy Efficient Wireless Sensor Network: Pooran Joshi; Teja Kuruganti; Stephen Killough; Yongchao Yu; Aravind Mikkilineni; Anming Hu; Oak Ridge National Laboratory; University of Tennessee, Knoxville

9:00 AM Invited
Electro-mechanical Methods to Determine the Reliability of Flexible Electronics: Megan Cordill; Erich Schmid Institute

9:30 AM
Advancing the Understanding of Continuous Direct-write Printing by Operando Coherent X-ray Scattering: Maria Torres Arango; Ruipeng Li; Gregory Doerk; Lutz Wiegart; Brookhaven National Laboratory

9:50 AM Invited
3D Printing of Hierarchical Multifunctional Foams: Konstantinos Sierrros; West Virginia University

10:20 AM Break

10:40 AM
Fabrication of Optically Transparent Glass via a Microfluidic-assisted Sol-gel 3D-print: Yuyuan He; Alvin Chang; Chih-hung Chang; Oregon State University

11:00 AM Invited
Some Research Work on a Novel “Double-pulse Laser Micro Sintering” Process: Hanyu Song; Ze Liu; Benxin Wu; Purdue University

11:30 AM Invited
Direct Ink Writing of Wearable Thermoresponsive Supercapacitors: Yayue Pan; Yizhou Jiang; University of Illinois, Chicago
### BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings II

**Sponsored by:** TMS: Thin Films and Interfaces Committee

**Program Organizers:** Adele Carrado, IPCMS - CNRS; Nancy Michael, University of Texas Arlington; Gerald Ferblantier, Icube Laboratory; Heinz Palkowski, Clausthal University of Technology; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Vikas Tomar, Purdue University

**Thursday AM | March 14, 2019**

**217A | Henry B. Gonzalez Convention Center**

**Session Chairs:** Chintalapalle Ramana, University of Texas El Paso; Nuggehalli M Ravindra, New Jersey Institute of Technology

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Affiliation(s)</th>
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<tbody>
<tr>
<td>8:30 AM</td>
<td>Keynote</td>
<td>Tailoring Thermal Properties through Ion Beam Modifications: Khalid Hattar; Ethan Scott; Cody Dennett; Christopher Saltonstall; Thomas Beechem; Patrick Hopkins; Michael Short; Sandia National Laboratories; University of Virginia; Massachusetts Institute of Technology</td>
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<tr>
<td>9:10 AM</td>
<td>Invited</td>
<td>Tuning Structural, Electrical and Optical Properties of Al-doped ZnO Thin Films by Pulse DC/DC Reactive Magnetron Co-sputtering: Lirong Sun; John Grant; John Jones; Neil Murphy; Air Force Research Laboratory</td>
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<td>9:40 AM</td>
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<td>Fabrication and Characterization of Oxide Thin Films for Energy Related Applications: Ramana Chintalapalle; University of Texas, El Paso</td>
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<td>10:00 AM</td>
<td>Break</td>
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<tr>
<td>10:20 AM</td>
<td>Keynote</td>
<td>Engineering Second-order Nonlinear Optical Materials by Pulsed Laser Deposition with In Situ Ellipsometry: John Jones; Cristian Orozco; Nanthakshoire Makeswaran; Ekaterina Poutrina; Oded Rabin; Cynthia Bowers; Lirong Sun; Chintalapalle Ramana; Augustine Urban; Air Force Research Laboratory; University of Texas, El Paso; UES; University of Maryland; Wright State University</td>
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<tr>
<td>11:00 AM</td>
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<td>Structural, Optical and Electrical Property Evaluation of RF-Sputtered Molybdenum Thin Films: Anil Krishna Battu; Vishal Zade; Ramana Chintalapalle; University of Texas, El Paso</td>
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<td>11:20 AM</td>
<td></td>
<td>Self Healing in Materials: An Overview: Samiha Hossain; Nuggehalli Ravindra; New Jersey Institute of Technology</td>
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### ELECTRONIC MATERIALS

Solar Cell Silicon — Slag, Recycling, and Photovoltaics

**Sponsored by:** TMS: Materials Characterization Committee

**Program Organizers:** Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

**Thursday AM | March 14, 2019**

**008A | Henry B. Gonzalez Convention Center**

**Session Chair:** York Smith, University of Utah

<table>
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<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Affiliation(s)</th>
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<tr>
<td>8:30 AM</td>
<td>Introductory Comments</td>
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<tr>
<td>8:35 AM</td>
<td>Invited</td>
<td>Physical Separation Methods to Recovery Solar Si for Recycling: York Smith; University of Utah</td>
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<tr>
<td>9:15 AM</td>
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<td>Wettability Behavior of Si/C and Si-Sn Alloy/C System: Yaqiong Li; Lifeng Zhang; University of Science &amp; Technology Beijing</td>
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<tr>
<td>9:35 AM</td>
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<td>Recycling Silicon Kerf as a Feedstock for Solar Silicon Production: Jan-Philipp Mai; JPM Industries</td>
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<tr>
<td>9:55 AM</td>
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<td>Break</td>
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<tr>
<td>10:15 AM</td>
<td></td>
<td>Transmission Electron Microscopy Study of DIO3 and UVo Cleaned Silicon Surfaces for Solar Cell Applications: Haider Ali; Sara Bakhshi; Ngwe Zin; Winston Schoenfeld; Kristopher Davis; University of Central Florida</td>
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<tr>
<td>10:35 AM</td>
<td>Phase Diagrams of Al-Si System: Shadia Ikhmayies; Al Isra University</td>
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<td>10:55 AM</td>
<td>Diving Deep into Silane Pyrolysis Chemistry to Enable New Silicon-refining Reactor Technologies: Guro Wyller; Anjitha S G; Marte Skare; Hallgeir Klette; Thomas Preston; Insitutt for Energiteknikk</td>
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<td>10:55 AM</td>
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</table>
2:00 PM Introductory Comments

2:05 PM
Experimental Study on the Mechanism of Lead Vapor Condensation Under Vacuum: Huan Zhang; Zhenghao Pu; Yifu Li; Junjie Xu; Baoqiang Xu; Bin Yang; Kunming University of Science and Technology

2:25 PM
Effect of Ce Treatment on the Composition of Nucleation Inclusion in Ti-Mg Complex Deoxidized C-Mn Steel: Zhen Liu; Bo Song; Longfei Li; Zeyun Cai; Xiaokang Cui; University of Science and Technology Beijing

2:45 PM
Effects of La Addition on Inclusions, Microstructures and High Temperature Mechanical Properties of As-cast FeCrAl Alloys: Yang He; Jianhua Liu; Yindong Yang; Alex McLean; University of Science and Technology Beijing; University of Toronto

3:05 PM
Fabrication of Co-Cr-Mo Alloy Fibers from the Melt by Unidirectional Solidification, and their Microstructure and Mechanical Properties: Yuji Yokota; Takayuki Nihei; Masao Yoshino; Akihiro Yamaji; Yuji Ohashi; Shunsuke Kurosawa; Kei Kamada; Akira Yoshikawa; Tohoku University; C&A Corporation

3:25 PM
Removal of Copper from Fe-Cu Alloy by Using Iodine: Yuichi Takamatsu; Takashi Nagai; Chiba Institute Of Technology

3:45 PM Concluding Comments

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**Thursday PM | March 14, 2019**

**208 | Henry B. Gonzalez Convention Center**

**Session Chair:** Mingming Zhang, ArcelorMittal Global R&D

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**2:00 PM Introductory Comments**

**2:05 PM**
Application and Mechanism of Dolomite in High Magnesium Pellets: Feiyu Meng; Tao Jiang; Qiang Zhong; Qian Li; Yongbin Yang; Central South University; Central South University; China University of Geosciences; Central South University; Chongqing University; Central South University

**2:25 PM**
Correlation between Reduction Degree and Softening and Melting Properties of Pellets: YuZhu Pan; Jingsong Wang; University of Science and Technology Beijing

**2:45 PM**
Effect of TiO2 on the Viscous Behavior of the CaO-SiO2-14 Mass% Al2O3-8 Mass% MgO-TiO2 Slag: Zhengde Pang; Yuyang Jiang; Wenchao He; Chongqing University

**3:05 PM**
Formation of Calcium Ferrites in Sintering Process of Raw Materials with FeO-SiO2-CaO-TiO2: Xingmin Guo; Yan-Bo Chen; Nan Xiang; University of Science and Technology Beijing

**3:25 PM Break**

**3:45 PM**
Granulation of Semisteel by Rotary Disc Atomizer: Wenchao He; Xuewei Lv; Feifei Pan; Xueqin Li; Zhengde Pang; Chongqing University

**4:05 PM**
Dissolution Kinetics of Titanium in Carbon-saturated Iron: Leizhang Gao; Tongxiang Ma; Zhiming Yan; Meilong Hu; Chongqing University

**4:25 PM**
Study on the Three-dimensional Distribution of Sulfide in High Sulfide Steel: Dong Zhang; Ping Shen; Yang Wang; Qian-kun Yang; Jian Cheng; Jian-xun Fu; Shanghai University

**4:45 PM Concluding Comments**
ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries IV

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Thursday PM | March 14, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Partha P. Mukherjee, Purdue University; George Nelson, University of Alabama, Huntsville

2:00 PM Keynote
Understanding Gas Evolving Reactions and the Effects of Gaseous Products on Li ion Cycle Life: Shen Dillon: 1University of Illinois

2:30 PM Invited
Local Structure and Capacity Fade Correlations in Cathode Materials for Multivalent-ion Intercalation: Christopher Patridge: 2D’Youville College

2:55 PM Invited
Scultping Atomically Disordered Oxides for Fast Ion Conduction: Ritesh Sachan: 1Army Research Office; 2Oak Ridge National Laboratory; 3University of Tennessee

3:20 PM
One Dimensional Nanomaterials for Emerging Energy Storage: Liqiang Mai: 1Wuhan University of Technology

3:40 PM Break

4:00 PM Keynote
Tuning Ionic Mobility in Solid Electrolytes via Lattice Disorder: Donald Siegel: 1University of Michigan

4:30 PM
Iron Doped Gallium Oxide (Ga2-xFexO3): Structure, Chemistry and Dielectric Properties: Swadipita Roy: 1Matlesham Bandi; Vaithiyalingam Shuttanandan: 1SINTEF Materials and Chemistry; Suntharampillai Thevuthasan: 1University of Pennsylvania; Ramana CV: 1University of Texas El Paso; 2Pacific Northwest National Laboratory

4:50 PM
High Energy in situ SR-XRD Studies of Pure Pb, Pb-Bi, and Pb-Ba Foils at Elevated Temperatures: Matthew Carl: 1Michael Wall; Jesse Smith: 1Matthew Raiford; Tim Ellis: 1Yang Ren; 2Rick Reidy; Marcus Young: 1University of North Texas; 3RSR Technologies; 4Argonne National Laboratory

5:10 PM
Modeling Thermal Resistance of the Interface between Mechanically Contacting Surfaces: Seyed Aria Hosseini: 1Seshu Nimmala: 1Jackson Harter; Todd Palmer: 1Eric Lenz: 1Alex Greaney; 2University of California, Riverside; 3Lam Research Corporation; 4Oregon State University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries V

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Thursday PM | March 14, 2019
213B | Henry B. Gonzalez Convention Center

Session Chair: Partha P. Mukherjee, Purdue University

2:00 PM Invited
Understanding the Mesoscopic Phase Transformation Kinetics in Intercalation Compounds: Liang Hong: 1Kaiqi Yang: 1Ming Tang: 2Rice University

2:20 PM
Internal Resistance Temperature Detector Based Solution for Lithium-ion Battery Thermal Events Prediction, Prevention and Control: Bing Li: 1Mihit Parekh; 2Ryan Adams; 3Vikas Tomar; 4Vilas Pol: 1Purdue University

2:40 PM

3:00 PM
Aprotic Li/O2 Batteries: Reactions and Products in Different Electrolytes: Matthias Augustin: 1Per Erik Vullum; 2Fride Vullum-Bruer; 3Ann Mari Svensson: 1Norwegian University of Science and Technology; 2SINTEF Materials and Chemistry

3:20 PM Break

3:40 PM
Li-ion Capacitors: Combining Energy and Power Densities: Ganguli Babu: 1Keiko Kato; 2Pulickel Ajayan: 1Rice University

4:00 PM
Synthesis and Electrocatalytic Properties of Ni-Fe Layered Double Hydroxide Nanomaterials: Mengxin Miao: 1Xiaobo Han: 2Rulong Jia: 1Wei Ma; 2Guihong Han: 3Zhengzhou University
ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — In Situ Synchrotron Measurements

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Thursday PM | March 14, 2019
221A | Henry B. Gonzalez Convention Center

Session Chair: John Carpenter, Los Alamos National Laboratory

2:00 PM Invited
Capturing Microstructure and Defect Formation during Laser Additive Manufacturing Using Synchrotron Imaging: Peter Lee1; Chu Lun Alex Leung1; Sam Clark1; Yunhui Chen1; Lorna Sinclair1; Sebastian Marussi2; Azeem Mohammed2; Margie Olbinado2; Robert Atwood3; Iain Todd3; 1University of Manchester; 2University College London; 3University of Sheffield

2:30 PM
In Situ and Operando Synchrotron Quantification of Transient Defect Dynamics during Additive Manufacturing of Ti-6Al-4V: Yunhui Chen1; Lorna Sinclair1; Samuel Clark1; Chu Lun Alex Leung1; Sebastian Marussi2; Robert Atwood3; Margie Olbinado2; Alexander Racz1; Iain Todd3; Peter Lee1; 1University of Manchester; 2University of Sheffield; 3University College London

2:50 PM
Effects of Residual Stress on Additively Manufactured Stainless Steel: In-situ Synchrotron Experiment and Crystal Plasticity Modeling: Xin Zhang1; Wen Chen1; Thomas Voisin2; Morris Wang2; Ting Zhu2; 1Georgia Institute of Technology; 2Lawrence Livermore National Laboratory

3:10 PM
In Situ Characterization of Deformation Mechanisms in L-PBF 316L Stainless Steels: Thomas Voisin1; Wen Chen1; Jean-Baptiste Forien1; Yimin Wang2; 1Lawrence Livermore National Laboratory

3:30 PM Break

3:50 PM
In-situ Dynamic X-ray Radiography Combined with Multiphysics Numerical Modeling to Elucidate Laser-induced Keyhole Dynamics in SS304: Nadia Kouraytem1; Xuexiao Li2; Ross Cunningham3; Cang Zhao4; Anthony Rollett4; Tao Sun4; Ashley Spear4; Wenda Tan4; 1University of Manchester; 2University of Utah; 3Carnegie Mellon University; 4Argonne National Laboratory

4:10 PM
Monitoring AM Process of Ni-based Superalloys Using High-energy X-ray Diffraction: Chih-Pin Chuang1; Tao Sun2; Niranjani Parab3; Cang Zhao3; Yan Gao3; William Carter3; Peter Keneski4; Jun-Sang Park4; Jonathon Almer5; 1Argonne National Laboratory; 2GE Global Research Center

4:30 PM
Investigation of the Complex Thermal Exposure of AM Processes Utilizing High Spatio-temporal In-situ DT-MAX and In-situ Synchrotron X-ray Techniques for Aluminum Based Alloys: Kai Zweicher1; Seth Griffith1; Xiaohuang Li2; Christoph Kene1; Daniel Grolimund2; Dario Ferreira Sanchez3; Joseph McKeown2; Christian Leinenbach1; 1Empa, Swiss Federal Laboratories for Materials Science and Technology; 2Northwestern University, Department of Materials Science and Engineering; 3Paul Scherrer Institut, Swiss Light Source; 4Lawrence Livermore National Laboratory, Condensed Matter and Materials Division

4:50 PM
A Miniaturized Device for In-situ X-rays Investigation during Selective Laser Melting: Samy Hocine1; Daniel Grolimund2; Steven Van Petegem1; Helena Van Swygenhoven1; 1Paul Scherrer Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Novel Materials and Applications

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Thursday PM | March 14, 2019
217C | Henry B. Gonzalez Convention Center

Session Chair: Judy Schneider, University of Alabama at Huntsville

2:00 PM Invited
Metallic Alloys Development for Additive Manufacturing Using Gas Atomization and Selective Laser Melting: Yongho Sohn1; Le Zhou1; 1University of Central Florida

2:30 PM Invited
Development of Ti-based Materials Tailored to Laser Additive Manufacturing: Guillermo Requena1; Pere Barriobero Vila2; Joachim Gussone3; Jan Haubrich1; Ulrike Hecht1; Angelos Theofiliatos2; 1DLR; 2Access

3:00 PM
Printability and Deformation Behaviour of CrMnFeCoNi High-entropy Alloy Made by Laser Powder Bed Fusion: Minh-Son Pham1; Minh-Son Pham1; Imperial College London

3:20 PM
Microstructures and Properties of Tungsten Alloys Prepared Using Laser Melting Deposition Process: Guomin Le1; Shiyu Ma1; Yingpei Wang1; Chun Li2; Yue Liu3; 1Institute of Materials; 2North China University of Technology; 3China Academy of Engineering Physics
3:40 PM Break

4:00 PM
Effect of Process Parameters on Additively Manufactured Shape Memory Alloys: Alejandro Hinojos1; Soheil Saedi2; Narges Shayesteh Moghaddam3; Ehsan Saghalian4; Mohammadreza Nematzadeh5; Haluk Karaç4; Mohammad Elahijahani6; Michael Mills7; 1Ohio State University; 2The University of Arkansas at Little Rock; 3The University of Texas at Arlington; 4The University of Toledo; 5University of Kentucky

4:20 PM
Forming Abrupt Dissimilar Metal Junctions by Additive Manufacturing Techniques: Nick Jones1; Wentliang Li2; Jack Beuth3; Maarten De Boer4; 1Carnegie Mellon University

4:40 PM
Characterization of Interfacial Bond Properties of Additively Manufactured Cladded Surfaces Using Scanning Vibrating Electrode Technique: Pratik Murlute1; Somayeh Pasebanian2; Burkan Isgor3; 1Oregon State University; 2Oregon State University, Advanced Technology and Manufacturing Institute

ADDITIVE TECHNOLOGIES
Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process-microstructure Relationships II

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Thursday PM | March 14, 2019
224 | Henry B. Gonzalez Convention Center

Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

2:00 PM Invited
Mechanisms of Morphological Defect Creation in Metal Additive Manufacturing: Manyatibo Matthews1; Nicholas Calta2; Aiden Martin3; Philip DePond4; Gabe Guss5; Saad Khairallah6; Wayne King7; Alexander Rubenchik8; Tony van Buuren9; 1Lawrence Livermore National Laboratory

2:30 PM
Unravelling Cracking Phenomena during Laser Additive Manufacturing of Ni-based Superalloy by Multi-modal Imaging: Chu Lan Alex Leung1; Samuel Clark2; Sebastian Marussi3; Leigh Stanger4; Margie Obinado5; Sam Tammas-Williams6; Yunhui Chen7; Lorna Sinclair8; Alexander Rack9; Jon Willmott10; Ian Todd11; Peter Lee12; 1University College London; 2University of Manchester; 3University of Sheffield; 4European Synchrotron Radiation Facility

2:50 PM
Rapid Solidification Dynamics in Laser Powder Bed Fusion Additive Manufacturing Process: Lianghua Xiong1; Cang Zhao2; Qibin Gudi1; Luis Escano3; Minglei Qu4; Seyyed Hojjat Zadeh5; Niranjoo Parab6; Kamil Fezza7; Wes Everhart8; Tao Sun9; Lianyi Chen10; 1Missouri University of Science and Technology; 2Advanced Photon Source, Argonne National Laboratory; 3Department of Energy’s Kansas City National Security Campus Managed by Honeywell FM&T

3:10 PM
Powder Flow, Melting and Solidification Process in Additive Manufactured Ni-based Metal Matrix Composites: Sen Jiang1; Baolong Zheng2; James Haley3; Binging Chen4; Jiayu Liang5; Shuai Huang6; Julie Schoenung7; Enrique Lavermia8; 1University of California Irvine; 2Beijing Institute of Aeronautical Materials

3:30 PM Break

3:50 PM
Microstructural Selection for Lattice Structures Using Deposition Optimisation and Cooling Rate Control in Laser Powder Bed Fusion of 316L Stainless Steel: Filippo Vecchiato1; Paul Hooper2; Mark Wenman3; 1Imperial College London

4:10 PM
Finite Element Analysis of Particle Pushing during Selective Laser Melting of AlSi10Mg/AlN Composites: Marjan Nezafati1; Ali Bakhshinejad2; Pradeep Rohatgi3; Benjamin Church4; 1University of Wisconsin

ADDITIVE TECHNOLOGIES
Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process Modeling

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Thursday PM | March 14, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Andrew Kustas, Sandia National Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory

2:00 PM Computationaly Efficient Thermo-mechanical Modelling in Metal Additive Manufacturing: Yabin Yang1; 2Sun Yat-Sen University

2:30 PM
Non-equilibrium Solidification Path Estimation for Additive Manufacturing: Abhishek G.S.1; 2Durga Ananthanarayan3; Debashis Kar4; Abhik Choudhury5; Shyamprasad Karagadd6; Sanjay K Sondhi7; 2Indian Institute of Technology Bombay; 2GE India Industrial Pvt. Ltd.; 8Indian Institute of Science

2:50 PM
Fast Solution Strategies for Transient Heat Conduction Predictions in Powder Bed Fusion Additive Manufacturing: Alexander Wolf1; Carlos Ruvalcaba2; Richard Ols3; Saad Khairallah4; Kevin Wheele5; Dogan Timucin6; Andy Anderson7; Andrew A. Shapiro8; Jean-Pierre Delplanque9; 1University of California, Davis; 2Jet Propulsion Laboratory, California Institute of Technology; 3Lawrence Livermore National Laboratory; 4NASA Ames Research Center

3:10 PM
Laser Interaction with Surface in Powder Bed Melting Process and Its Impact on Temperature Profile, Bead and Melt Pool Geometry: Leila Ladani1; Faiyaz Ahsan2; 1University of Texas at Arlington

3:30 PM Break

3:50 PM
The Microscale Interaction Mechanism Between Laser and Metal Powder in Additive Manufacturing: Simulation and Experiment: Hongze Wang1; Yu Zou2; 1University of Toronto
4:10 PM
Sensitivity of Thermal Predictions to Uncertain Fluid Properties in Additive Manufacturing of Superalloys: Alex Piotrowski; John Coleman; Benjamin Stump; Matthew Krane; Jarred Heigel; Richard Ricker; Lyle Levine; Ryan Dehoff; Oak Ridge National Laboratory; Purdue University; National Institute of Standards and Technology

4:10 PM
The Effect of the Addition of Grain Refiners to the Microstructure of Aluminium Alloys in Laser-based Solidification Processing: Mitesh Patel; Dong Qiu; Mark Gibson; Gui Wang; David StJohn; Mark Easton; RMIT University; University of Queensland

4:50 PM
Overcoming Edge and Over-hang Effect in Metal Additive Manufacturing by Process Parameters and Deposition Strategy Design: Jinquan Cheng; Composite Solutions and Digital Manufacturing

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session VI

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Nikolai Hrabe, National Institute of Standards and Technology - Boulder; Steve Daniewicz, University of Alabama; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University

Thursday PM | March 14, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Steve Daniewicz, University of Alabama

2:00 PM
Invited
Fatigue Behavior of Aluminum Alloys Fabricated by Solid-state Additive Manufacturing: J. Brian Jordan; Paul Allison; Dustin Avery; Ben Rutherford; The University of Alabama

2:30 PM
Tensile, Compressive, Cyclic, and Fracture Behavior of Direct Metal Laser Sintered Ti64: Saeede Ghobanpour; Brandon McWilliams; Marko Knezevic; University of New Hampshire; US Army Research Laboratory

2:50 PM
Non-destructive Mechanical Testing of Additive Manufactured Materials: Soheil Safari Ioalihan; Steve Paltovic; Parth Patel; Simon Belizare; Massachusetts Materials Technologies

3:10 PM
Influence of Process Parameters on Fracture Toughness of AlSi10Mg Alloy Fabricated through Laser Beam Melting: Srinivasa Rakesh; Priyanka Nadig; Nilesh Vasa; Jayagaran R; Indian Institute of Technology Madras; Intech DMLS Private Limited

3:30 PM
Break

3:50 PM
Exploring the Effect of Size on IN718 Parts Produced by Powder Bed Fusion: Oliver Holzmund; Guofeng Wang; Xiaodong Li; University of Virginia; University of Pittsburgh

4:10 PM
Why 3D-printing at the Beach is not the Perfect Work-life Balance: Some Observations on Moisture Effects in Metal Powders: Noah Philips; Nicholas Cunningham; ATI

4:30 PM
The Role of As-printed Defects and Microstructural Heterogeneities in EBM-PBF Ti-6Al-4V: Tensile Testing and Characterization at Appropriate Length Scale: Nik Hrabe; Jake Benzinger; Li-Anne Liew; Ryan White; Frank DelRio; Fracture and Fatigue Group, ACMD, MML, NIST-Boulder

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM III

Sponsored by: TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Pooranji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Thursday PM | March 14, 2019
221D | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Mahdi Jamshidinia, GE Additive

2:00 PM
Gamma Titanium Aluminide Doped with Niobium: Aerospace Applications: Monnamme Tlotteng; Council for Science & Industrial Research

2:20 PM
Gas Atomization and Selective Laser Melting of Zr-Modified AA5083 Alloy: Le Zhou; Holden Hyer; Sharon Park; George Benson; Guilherme Gottsfritz; Yongho Sohn; University of Central Florida

2:40 PM
In Situ Formation of Oxides through Exposure to a Reactive Gas Atmosphere During Selective Laser Melting: Michael Haines; Nicolas Peter; Eric Jägle; Dierk Raabe; Sudarsanam Babu; University of Tennessee Knoxville; Max-Planck-Institut für Eisenforschung GmbH

3:00 PM
In Situ Synthesis of Bulk Metallic Glass Materials in a Periodic Structure by Using Laser Direct Deposition: Shunyu Liu; Yung Shin; Purdue University

3:20 PM Break

3:40 PM
Optimization of Additive Manufacturing Process for ODS Zr-based Alloy Design: Hyun-gil Kim; Il-hyun Kim; Yang-il Jung; Byung-Kwon Choi; Korea Atomic Energy Research Institute

4:00 PM
Modeling Evaporation in Powder Bed Processing of Inconel and Ti6Al4V Material: Leila Ladan; Fayyaz Ahsan; Jafar Razmi; University of Texas at Arlington

4:20 PM
Composition Control in Laser Powder Bed Fusion Additive Manufacturing Through Differential Evaporation: Meelad Rastiefer; Ibrahim Karaman; Alaa Elwany; Raymundo Arroyave; Texas A&M University

4:40 PM
Strain Hardening and Load Transfer in Additively Manufactured Interpenetrating Composites: Abdel Moustafa; Zachary Cordero; Rice University
ADVANCED MATERIALS

Advanced High-Strength Steels III — Mechanical Properties of Advanced High-Strength and Microalloyed Steels

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Thursday PM | March 14, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Amy Clarke, Colorado School of Mines; Chloe Johnson, Colorado School of Mines

2:00 PM Hydrogen Effects on Elastic Properties of Advanced High-strength Steels: Jinwoo Kim1; Haoxue Yan1; Comal Cem Tasan1; 1Massachusetts Institute of Technology

2:20 PM Effect of Hydrogen on Grain Refinement Behavior of Pure Fe by High-pressure Torsion-straining: Hirokazu Sato1; Yoshikazu Todaka1; Koichi Sato1; Nozomu Adachi1; 1Toyohashi University of Technology; 2Kagoshima University

2:40 PM Over Five-times Improved Elongation-to-fracture of 1180 Dual-Phase Steel by Continuous-bending-under-tension: Marko Knezevic1; Camille Poulin1; 1University of New Hampshire

3:00 PM Comparison of Formability and Microstructural Evolution of C106 Copper and 316L Stainless Steel: Scott Taylor1; Iain Masters1; Zushu Li1; Hiren Kotadia1; 1WMG

3:20 PM Break

3:40 PM Use of In Situ Methods to Study Damage Processes in DP1300 with V Additions: David Wilkinson1; Javad Samei1; Linfeng Zhou1; 1McMaster University

4:00 PM Structural and Microstructural Influence on Deformation and Fracture of Dual-phase Steels: Xinzhu Zheng1; Shmuel Osovski1; Ankit Srivastava1; 1Texas A&M University; 2Technion - Israel Institute of Technology

4:20 PM Effect of Niobium on Microstructural and Mechanical Properties of Nb-Ti Microalloyed Carbide-free Bainitic Steels: Xi Chen1; Fuming Wang2; Changrong Li2; Shuai Liu2; 1University of Science and Technology Beijing
ENERGY & ENVIRONMENT


_Sponsored by_: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

_Program Organizers_: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Thursday PM | March 14, 2019
225B | Henry B. Gonzalez Convention Center

_Session Chair_: Michael Kesler, Oak Ridge National Laboratory

2:00 PM Invited
Enabling 6.5% Silicon Electric Steel for Motor Application: Jun Cui1; Gyu Yang Gao Yuan1; Brandt Jensen2; Chad Macziewski3; Kevin Dennis4; Senlin Cui1; Valery Levitas5; Tao Ma5; Lin Zhou4; Matt Kramer2; 1Iowa State University; 2Ames Laboratory

2:30 PM Invited
Extremely Thin Large Grain Fe-Co for High Power Devices: Zafer Turgut; Audrey Lee; Jeremy Shin; Alex Leary; John Horwath; Gregory Kozlowski; 1Air Force Research Laboratory; 2University of Illinois at Urbana–Champaign; 3NASA/GRC; 4Wright State University

3:00 PM
Templated Austenitization for Tuned Flux Paths in a Dual Phase, High Cr Steel for Electric Rotor Applications: Hunter Henderson1; Min Zou1; Frank Johnson2; Craig Bridges3; Michael Brady1; Michael McGuire1; Michael Kesler1; Orlando Rios1; 1Oak Ridge National Laboratory; 2General Electric

3:30 PM
Reducing Porosity and Cracks in Fe-Si Soft Magnetic Parts Processed by Selective Laser Melting: Leonidas Gargalis1; Ian Ashcroft1; Richard Hague1; Michael Galea1; 1University of Nottingham, Center for Additive Manufacturing

4:00 PM
Microstructural Design through Application of Magnetic Field during Electrodeposition: Heather Murdoch1; Denise Yin1; Efrain Hernández-Rivera1; Anita Giri1; 1US Army Research Laboratory

4:20 PM
Production of High-resistivity Electrical Steel Alloys by Substitution of Si with Al and Cr: Brhayan Puentes Rodriguez1; David Brice1; James Mann2; Srinivasan Chandrasekar1; Kevin Trumble2; 1Purdue University; 2University of West Florida

CHARACTERIZATION

Advanced Real Time Imaging — Phase Transformation II

_Sponsored by_: TMS: Alloy Phases Committee

_Program Organizers_: Jinichiro Nakano, US Department of Energy; Michael Kesler, Carnegie Mellon University; Canand Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zutai Zhang, Southern University of Science and Technology; Nesilhan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Salto, Kyushu University; Yongsgu Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Thursday PM | March 14, 2019
302B | Henry B. Gonzalez Convention Center

_Session Chairs_: Anna Nakano, United States Department of Energy National Energy Technology Laboratory; Jinichiro Nakano, United States Department of Energy National Energy Technology Laboratory

2:00 PM Invited
In Situ Observations of Rapid Solidification of Undercooled Melts using a High-speed Camera: Jianrong Gao1; 1Northeastern University, China

2:30 PM
In Situ Measurement of Solute Partition Coefficients in Fe-Cr-Ni-Mo-Cu Alloys by Using X-ray Imaging and X-ray Fluorescence Analysis: Yusuke Kobayashi1; Hidekazu Todoroki1; Kento Dobara1; Cheolhee Nam1; Kohei Morishita1; Hideyuki Yasuda1; 1Nippon Yakin Kogyo Co., Ltd.; 2Kyoto University; 3Kyushu University

2:50 PM Panel Discussion

3:10 PM Concluding Comments

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Crystal Plasticity Methods II

_Sponsored by_: TMS: Computational Materials Science and Engineering Committee

_Program Organizers_: Srujan Rokkam, Def-Aero, Advanced Cooling Engineering Committee; Michael Tonks, University of Florida; Remi Dingeville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday PM | March 14, 2019
303C | Henry B. Gonzalez Convention Center

_Session Chairs_: Michael Sangid, Purdue University; III Ryu, The University of Texas at Dallas

2:00 PM Invited
Microstructural Predictions of Thermo-mechanical Fracture of H.C. P. Alloys: Mohammed Zihry1; II. Mohammed2; 1North Carolina State University

2:30 PM
Multiscale Mechanics of Ductile Damage in HCP Materials: Shailendra Joshi1; Padmeya Indurkar1; 1University of Houston; 2National University of Singapore
2:50 PM
Parametrically Homogenized Continuum Damage Mechanics (PHCDM) Model for Composites from Micromechanical Analysis:
Xiaofan Zhang1; Zhiye Li2; Daniel O’Brien3; Somnath Ghosh1; 1Johns Hopkins University; 2U.S. Army Research Laboratory

3:15 PM
Continuum Dislocation Dynamics at Finite Deformation: Computational Modeling and Preliminary Results: Kyle Starkey1; Anter El-Azab1; Grethe Winther2; 1Purdue University; 2Technical University of Denmark

3:35 PM Break

3:55 PM
Initializing Residual Stresses in Crystal Plasticity Simulations and its Validation Using High Energy X-ray Diffraction Experiments: Kôrith Kapoor1; Diwakar Naraganti; Michael Sangid2; 1Purdue University

4:15 PM
Modelling the Role of Inclusions and Debonded Region on the Fatigue Performance of Ni-based Superalloys: Ritwik Bandyopadhyay1; Michael Sangid2; Jonathan Dubke2; 1Purdue University; 2Rolls-Royce Meridian Center

4:35 PM
Self-healing of Low Angle Grain Boundaries by Vacancy Diffusion and Dislocation Climb: Yejun Gu1; Yang Xiang2; David Srolovitz2; Jaafar El-Awady1; 1Johns Hopkins University; 2Hong Kong University of Science and Technology; 2University of Pennsylvania

4:55 PM
Probing Defect-controlled Deformation Mechanisms via Multiscale Discrete Defect Element Method: Taejoon Park1; Cuong Nguyen2; Farhang Pourboghrat; Ill Ryu2; 1The Ohio State University; 2The University of Texas at Dallas

5:15 PM
Computational Investigation of Crack-induced Hot-spot Generation in Energetic Composites: Liqiang Lin1; Justin Wilkerson1; Xiaowei Zeng1; 1University of Texas at San Antonio; 2Texas A&M University

5:35 PM Concluding Comments

LIGHT METALS

Aluminum Reduction Technology — Cell Operations, Control and Improvements

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Marc Dupuis, GeniSim Inc

Thursday PM | March 14, 2019
004 | Henry B. Gonzalez Convention Center

Session Chair: Roman Düssel, TRIMET Aluminium SE

2:00 PM Introductory Comments

2:05 PM
Lengthy Power Interruptions and Pot Line Shutdowns: Alton Tabereaux1; Stephen Lindsay2; 1Consultant; 2Alcoa Inc.

2:30 PM
High Amperage Operation at Alcoa Deschambault Booster Section: Jayson Tessier1; Patrice Doiron1; Donald Ziegler1; 1Alcoa

2:55 PM
Potroom Operations Contributing to Fugitive Roof Dust Emissions from Aluminium Smelters: David Wong1; Margaret Hyland2; Nursian Tjahyono1; David Cotten1; 1University of Auckland; 2Victoria University of Wellington

3:20 PM
Advancement in Control Logic of HINDALCO Low Amperage Pots: Shaminth Rajgire1; Amit Jha1; Amit Gupta1; Manoj Chulliparambil1; Saroj Choudhary2; Gaurav Verma1; Vibhav Upadhyay2; Senthil Nath2; 1Aditya Birla Science and Technology Company (P) Ltd; 2Hindalco Industries Ltd, Renukoot

3:45 PM Concluding Comments

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Characterization

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Hahn Choo, University of Tennessee; Hahn Choo, University of Illinois at Urbana-Champaign; Muhammad Rafique

Thursday PM | March 14, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: E-Wen Huang, National Chiao Tung University; Matthew Kramer, Ames Laboratory

2:00 PM Invited
In Situ Observations and Quantification of Metastable States from Amorphous Alloys: Matthew Kramer1; Fanqiang Meng1; Lin Zhou1; Ryan Ott1; 1Ames Laboratory

2:20 PM Invited
Total Scattering Studies of Phase Transformation Kinetics in Metallic Glasses: Dong Ma1; Alexandru D. Stoica1; 1Oak Ridge National Laboratory

2:40 PM Invited
X-ray Diffraction Study of the Correlation between LTR Density and Plasticity of Bulk Metallic Glasses: Hui Wang1; Wojciech Dmowski1; Zengquan Wang1; Yoshikiko Yokoyama1; Hongbin Bie1; Takeshi Egami1; 1University of Tennessee, Knoxville; 2Tohoku University; 3Oak Ridge National Laboratory

3:00 PM Invited
Correlating Structural Heterogeneity to Properties of Metallic Glasses Using 4-Dimensional Scanning Transmission Electron Microscopy: Soohyun Im1; Jared Johnson1; Gabriel Calderon1; Menglin Zhu1; Pengyang Zhao1; Geun Hee Yoo2; Eun Soo Park2; Yunshi Wang1; Jinwoow Haewang1; 1Ohio State University; 2Seoul National University

3:20 PM Break

3:40 PM Invited
Structure and Dynamics of Metallic Liquids: Zengquan Wang1; Wojciech Dmowski1; Hui Wang1; Takeshi Egami1; 1University of Tennessee, Knoxville
4:00 PM Invited
Resolving Zr-based Bulk-metallic-glass Composite Distribution with High Fracture and Yield Strength by X-ray Nanodiffraction Mapping: Bo-Kai Chen1; Pei-Hua Tsai2; Jason Shian-Ching Jang3; Ching-Shun Ku4; Ching-Yu Chiang5; Shang-Ju Chiu6; Chia-Hsien Lin7; Hung-Sheng Chou8; E-Wen Huang9; 1Department of Materials Science and Engineering, National Chiao Tung University; 2Institute of Materials Science and Engineering, National Central University; 3National Synchrotron Radiation Research Center

4:20 PM
Shockwave Consolidation to Create Bulk Metallic Glass: David Nemiř1; Jan Bečk2; Lawrence Murr3; Yirong Lin4; Luis Chavez5; 1Txl Group, Inc.; 2University of Texas at El Paso

ADVANCED MATERIALS
Bulk Metallic Glasses XVI — Structures and Modeling II

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Thursday PM | March 14, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Alan Needleman, Texas A&M University; Mo Li, Georgia Institute of Technology

2:00 PM Invited
Discrete Shear Transformation Zone Plasticity: Babak Kondori1; Manish Vasoya2; A. Benzerga3; Alan Needleman4; 1Texas A&M

2:20 PM Invited
Pure Shear Deformation and Induced Mechanical Responses in Metallic Glasses: Zhukun Zhou1; Hao Wang2; Mo Li3; 1Central South University; 2Georgia Institute of Technology; 3Georgia Institute of Technology; Central South University

2:40 PM Invited
Local Volume as a Robust Structural Measure and Its Connection to Icosahedral Content in a Model Binary Amorphous System: Peter Derlet1; 1Paul Scherrer Institute

3:00 PM Invited
Modeling Metallic Glass Structural Evolution on Long Timescales: Thomas Hardin1; Christopher Schuh2; 1Massachusetts Institute of Technology

3:20 PM Invited
Effect of Oxygen on the Glass Forming Ability of Bulk Metallic Glasses: Zi-Kui Liu1; Brandon Bocklund2; Cheng Wang3; Shun-Li Shang4; Robert Dillon5; Richard Otis6; Stephen Hales7; 1Pennsylvania State University; 2California Institute of Technology

3:40 PM Break

4:00 PM
Perturbation Analysis of Amorphous Alloy Formation: Rahul Basu

4:20 PM
Machine Learning Framework to Resolve Structural Origin of Heterogeneous Deformation in Metallic Glasses: Qi Wang1; Anubhav Jain2; 1Lawrence Berkeley National Laboratory

4:40 PM Invited
Machine Learning Prediction of Elastic Properties and Glass Forming Ability of Bulk Metallic Glasses: San-Qiang Shih1; Jie Xiong2; Tong-Yi Zhang3; 1Hong Kong Polytechnic University; 2Shanghai University

NUCLEAR MATERIALS
Ceramic Materials for Nuclear Energy Research and Applications — Thermophysical Properties and Irradiation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Thursday PM | March 14, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Yongfeng Zhang, Idaho National Laboratory; Ahmed Hamed, Purdue University

2:00 PM
Phonon-based Lattice Thermal Conductivity of Uranium Dioxide: Ahmed Hamed1; Anter El-Azab2; 1Purdue University

2:20 PM
First Principles Prediction of Thermal Conductivity in Irradiated LiAlO2: Seyed Aria Hosseini1; Nicholas Whitman2; Todd Palmer3; P. Alex Greaney4; 1University of California, Riverside; 2Oregon State University

2:40 PM
Fouling Resistant, Fouulant-agnostic Coatings for Nuclear Reactors and Geothermal Systems: Cigdem Toparl1; Max Carlson2; Alexander Slocum3; Michael Short4; 1Massachusetts Institute of Technology

3:00 PM
Radiation Tolerance and Helium Swelling Resistance in Amorphous SiOC: Qing Su1; Michael Nastasi2; 1University of Nebraska-Lincoln

3:20 PM Break

3:40 PM
Influence of the Miscibility Gap in the Evolution of the Microstructure in UO2-based Fuel Doped with Nd: Bernardo Herrero1; Fabienne Audubert2; Yves Pontillon3; Lionel Desgranges4; Gianguido Baldinuzzi5; Nicolas Clavier6; Martiane Cabié7; 1CEA; 2CEN; 3Université Aix-Marseille

4:00 PM
Revealing Anisotropic Swelling Trends in Irradiated Hexagonal/Trigonal Materials: Arunodaya Bhattacharya1; Steven Zinkle2; Chad Parish3; Takaaki Koyanagi4; Yutai Katoh5; 1Oak Ridge National Laboratory; 2University of Tennessee, Knoxville, Oak Ridge National Laboratory
**CHARACTERIZATION**

Characterization of Materials through High Resolution Imaging — Imaging III

**Sponsored by:** TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

**Thursday PM | March 14, 2019**

**303A | Henry B. Gonzalez Convention Center**

**Session Chair:** Ross Harder, Argonne National Laboratory

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**2:00 PM Invited**

**Hard X-ray Coherent Diffraction Imaging Using Nanoscale Focusing Optics:** Martin Holt; 1Argonne National Laboratory

**2:30 PM Invited**

**Multi-modal 3D Imaging of LiNi1-x-yMnxCoyO2 Cathode Material with Concentration-gradient:** Xiaoqing Huang; Seongmin Bak; Hanfei Yan; Mingyuan Ge; Evgeny Nazaretski; Xiao-qing Yang; Yong Chu; 1Brookhaven National Laboratory

**2:50 PM**

**Materials Characterization via Optical Ptychographic Imaging:** Guido Cadenazzi; Nick Anthony; Eugenio Balaur; Keith Nugent; Brian Abbey; 1La Trobe University; 2Istituto Italiano di Tecnologia

**3:10 PM Invited**

**Understanding Catalyst Complexity at Synchrotron Light Sources Using Hard X-ray Ptychography and Tomography:** Thomas Sheppard; Yakub Fam; Johannes Becher; Ana Diaz; Mirko Hollier; Arne Wittstock; Gerald Falkenberg; Andreas Schropp; Christian Schroer; Jan-Dierk Grunwaldt; 1Karlsruhe Institute of Technology (KIT); 2Paul Scherrer Institute (PSI); 3University of Bremen; 4Deutsches Elektronen-Synchrotron (DESY)

**3:30 PM Break**

**3:50 PM**

**Examining Dzyaloshinskii Domain Walls in Asymmetric Pt/Co/Ni/Ir Superlattices Using Lorentz TEM:** Maxwell Li; 1Marc De Graef; Vincent Sokalski; 1Carnegie Mellon University

**4:10 PM**

**Investigation of Helium Precipitates in Ta(Ti)/Zr(Ti) Composites Made by Solid Metal Dealloying:** Sisi Xiang; Ian McCue; Yongqiang Wang; Kelvin Xie; Michael Demkowicz; 1Texas A&M University; 2Los Alamos National Laboratory

**4:30 PM**

**Measurements of Irradiation Induced 3D Strain Field at the Nanoscale with X-ray Bragg Coherent Diffraction Imaging:** Richard Sandberg; Mathew Cherukara; Reemu Pokharel; Eric Hahn; Wonsuk Cha; Ross Harder; Saryu Fensin; 1Los Alamos National Laboratory; 2Argonne National Laboratory

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**CHARACTERIZATION**


**Sponsored by:** TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li; Michigan Technological University; Jian Li; CanmetMATERIALS; Shadia Ikhmayies; Al Isra University; Mingming Zhang; AccelorMittal Global R&D; Yunus Kalay; Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

**Thursday PM | March 14, 2019**

**212B | Henry B. Gonzalez Convention Center**

**Session Chairs:** Andrew Brown, Army Research Laboratory; Ramasis Goswami, Naval Research Laboratory

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**2:00 PM**

**Introductory Comments**

**2:05 PM Invited**

**Enhancing Microstructural Segmentation of Electron Backscatter Diffraction Data Using Multivariate Statistical Analysis:** Angus Wilson; 1David Collins; Yevhen Zayachuk; Rajesh Kortla; Arantha Vilalta-Climente; 1University of Oxford; 2University of Birmingham; 3IIT Hyderabad; 4Université de Normandie Rouen

**2:25 PM Invited**

**Advances in Scratch Characterization of Automotive Clearcoats:** Pierre Morel; Linqian Feng; Nadia Benhamida; Warren Denning; Brandon Fry; Andrew Detwiler; Leslie Baker; Deepanjana Bhattacharya; 1Anton Paar USA; 2Eastman Chemical Company; 3Hyundai-Kia America

**2:45 PM**

**Microwave-assisted Solid-state Synthesis of Fluorinated Hydroxyapatite:** Qian Peng; Huimin Tang; Zhangui Tang; Zhiwei Peng; 1Central South University

**3:05 PM**

**Properties of ZnO Micro-/Nano Structures on Aluminum Substrates:** Shadia Ikhmayies1; Hassan Juwhari2; Bashar Lahlouh3; Al Isra University; 1University of Jordan

**3:25 PM**

**Synthesis and Electrochemical Properties of Molybdenum Disulfide/Graphene Composites:** Guihong Han; Wei Wang; Yanfang Huang; Yongqian Duan; Weijun Peng; 1Zhejiang University

**3:45 PM Break**

**4:00 PM**

**Construction of Form-stable Composite Phase Change Materials with Simultaneously Enhanced Latent Heat and Heat Transfer via Efficient Synergistic Effect between Expanded Vermiculite and Carbon Nanotubes:** Yong Deng; Jinhong Li; 1China University of Geosciences (Beijing)

**4:20 PM**

**Advancements in the Understanding of Damage Accumulation and Fracture of Brittle Materials:** Tomoko Sano; Brendan Koch; Calvin Lo; Timothy Walter; James Hogan; 1US Army Research Laboratory; 2University of Alberta
4:40 PM
Synthesis and Characterization of PVP/CaCO3-Ag Blend Hydrogel by Gamma Irradiation: Study of Drug Delivery System and Antimicrobial Activity: Angelica Zafalon; Vinicius dos Santos; Luiz Komatsu; Ademar Lugiao; Vijaya Rangari; Temesgen Samuel; Duclerc Parra; 1Ipen-Usp; 1Tuskegee University

CHARACTERIZATION


Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jian-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chengguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday PM | March 14, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Mingsheng He, Baowu Iron & Steel Group; Chengguang Bai, Chongqing University

2:00 PM Introductory Comments

2:05 PM
Microplastics: A Novel Method for Surface Water Sampling and Sample Extraction in Elechi Creek, Rivers State, Nigeria: Example Briggs; Esperidiana de Moura; Helio Furusawa; Marycel Elena Colr; Emeka Oguzie; Ademar Lugiao; 1Federal University of Technology, Owerri, Imo-State, Nigeria; 2Instituto de Pesquisas Energeticas e Nucleares

2:25 PM
Leaching Zinc from Crystallization Slag by Acid Leaching: Process Optimization Using Response Surface Methodology: Guojiang Li; Yongguang Luo; Tingfang Xie; Yunnan Chihong Zn & Ge Co., Ltd.

2:45 PM
Study on Recovery of Zinc from Metallurgical Solid Waste Residue by Ammoniacal Leaching: Ma Aiyou; Xuemei Zheng; Shengyou Shi; Haiye He; Yanhong Rao; Guoyan Luo; Fang Lu; 1Liupanshui Normal University

3:05 PM
Optimization of Fine Ilmenite Flotation Performed with Collectors: Yankun Wu; Shengpeng Su; Weijun Peng; Yongsheng Zhang; Guixia Fan; Guihong Han; Yijun Cao; Zhengzhou University

3:25 PM Break

3:40 PM
Catalytic Effect of Ferric Iron on the Bioleaching of Arsenopyrite Concentrates by Moderate Thermophile Sulfolobus thermosulfidooxidans: Duorui Zhang; Yu Deng; Jinlan Xia; Zhenyuan Nie; Lizhu Liu; Yidong Zhao; Lili Zhang; Hongying Yang; 1Key Lab of Biometallurgy of Ministry of Education of China, School of Minerals Processing and Bioengineering, Central South University; 2Beijing Synchrotron Radiation Facility, Institute of High Energy Physics, Chinese Academy of Sciences; 3Shanghai Synchrotron Radiation Facility, Shanghai Institute of Applied Physics, Chinese Academy of Sciences; 4School of Metallurgy, Northeastern University

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Uncertainty Quantification for Micro- and Macro-scale Modeling

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

Thursday PM | March 14, 2019
305 | Henry B. Gonzalez Convention Center

Session Chair: Liang Qi, University of Michigan

2:00 PM
Evaluation and Representation of Uncertainty in Thermodynamic Phase Diagrams: Noah Paulson; Brandon Bocklund; Zi-Kui Liu; Marius Stan; 1Argonne National Laboratory; 2Pennsylvania State University

2:20 PM
Efficient Propagation of Uncertainty From CALPHAD to Multiphysics Phase Field Microstructure Simulations: Pejman Honarmand; Vahid Attari; Isaac Benson; Raymundo Arroyave; Douglas Allaire; 1Texas A&M University

2:40 PM
Bayesian CALPHAD: From Uncertainty Quantification to Model Fusion: Pejman Honarmand; Thien Duong; Seyede Fatemeh Ghoreishi; Douglas Allaire; Raymundo Arroyave; 1Texas A&M University

3:00 PM
Impact of Uncertainty Quantification in Automated CALPHAD Modeling on the Design of Additively Manufactured Functionally-graded Alloys: Brandon Bocklund; Lourdes Bobbio; Richard Otis; ShunLi Shang; Allison Beese; Zi-Kui Liu; 1Pennsylvania State University

3:20 PM Break

3:40 PM
Uncertainty Quantification in Microstructural Reconstruction of Additively Manufactured Materials: Pinar Acar; Veera Sundararaghavan; 2Virginia Tech University; 3University of Michigan

4:00 PM
Uncertainty Quantification in Solidification Modeling of Additive Manufacturing: Supriyo Ghosh; E. Chin; J. Knap; D. Allaire; R. Arroyave; 1Texas A&M University; 2Army Research Laboratory

4:20 PM
Comprehensive Quality Assurance of Additive Manufacturing Ti-6Al-4V by Learning from Prior Studies: Sen Liu; Brandon Kappes; Aaron Stebner; Xiaoli Zhang; 1Colorado School of Mines
4:40 PM  
Quantifying Uncertainty in High Strain Rate Materials Strength with Bayesian Inference: David Rivera\(^1\); Jason Bernstein\(^2\); Katie Schmidt\(^2\); Nathan Barton\(^1\); Ana Kupresanin\(^1\); Jeff Florando\(^1\);  
\(^1\)Lawrence Livermore National Laboratory

5:00 PM  
Error Estimation for Stress Distributions and Macroscale Yield Prediction in Polycrystalline Alloys: Kamaliha Chatterjee\(^3\); Robert Carson\(^2\); Paul Dawson\(^1\); \(^1\)Cornell University  

PHYSICAL METALLURGY  
Computational Thermodynamics and Kinetics — Mechanics

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tourret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Thursday PM | March 14, 2019  
225C | Henry B. Gonzalez Convention Center

Session Chairs: Shawn Coleman, US Army Research Laboratory; Izabela Szlufarska, University of Wisconsin - Madison; Zhe Liu, University of Melbourne

2:00 PM Invited  
Phase-field Modeling of Swelling and Fracture of Lithium-silicon Electrode Materials: Alain Karma\(^2\); Ata Mesgarnejad\(^1\); \(^1\)Northeastern University

2:30 PM  
Dislocation Climb and Jog Nucleation in Molecular Dynamics: Anas Abu-Odeh\(^1\); Maeva Cottura\(^2\); Mark Asta\(^3\); \(^3\)University of California Berkeley

2:50 PM  
Solute-dislocation Interactions in Mg from First Principles: < c+a > and Twinning Dislocations with Flexible Boundary Conditions: Michael Fellinger\(^1\); Dallas Trinkle\(^2\); \(^2\)University of Illinois Urbana-Champaign

3:10 PM Invited  
Trends in Stability and Mechanical Response of Metallic Glasses: Izabela Szlufarska\(^1\); George Bokas\(^1\); Lei Zhao\(^1\); Chaiyapat Tangparajoen\(^1\); \(^1\)University of Wisconsin

3:40 PM Break

4:00 PM Invited  
A First-principles Computational Study of Segregation of Sn and Si Solutes into Fully Coherent Cu (111) Twin Boundary: Zhe Liu\(^1\); \(^1\)The University of Melbourne

4:30 PM  
Near-a TRIP Titanium Alloy Design: Fan Meng\(^1\); Gregory Olson\(^1\); \(^1\)Northwestern University

4:50 PM  
Estimation of Thermal Expansion Using Nonlinear Elasticity Theory: Ian Winter\(^1\); Daryl Chrzan\(^1\); \(^1\)University of California Berkeley

CORROSION  
Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Thursday PM | March 14, 2019  
214C | Henry B. Gonzalez Convention Center

Session Chairs: Yong Yang, University of Florida; Srujan Rokkam, Advanced Cooling Technologies Inc

2:00 PM  
Cracking and Fatigue Resistance of High-strength Nickel Alloys in Oilfield Applications: Bing Han\(^1\); \(^1\)Schlumberger

2:20 PM  
Similar and Dissimilar Metal Weld Failures in Hydrocracking Service at a Refinery: Sudhakar Mahajanam\(^2\); Cesar Espinoza\(^2\); Yenny Cubides\(^2\); \(^2\)Pinnacle Advanced Reliability Technologies; \(^3\)Texas A&M University

2:40 PM  
Physics-based Modeling of Corrosion Crack Dynamics Using Meshless Peridynamics Approach: Srujan Rokkam\(^2\); Max Gunzburger\(^2\); Masoud Behzadinasab\(^3\); Sachin Shanbhag\(^3\); Michael Brothers\(^4\); Nam Phan\(^5\); Kishan Goel\(^6\); \(^6\)Def-Aero, Advanced Cooling Technologies Inc; \(^7\)Florida State University; \(^8\)U.S. Naval Air Systems Command

3:00 PM  
The Effect of Localized Stresses and Heterogeneous Strains on Galvanic Corrosion in AA7050: Andrea Nicolas\(^2\); Alberto Mello\(^3\); Michael Sangid\(^1\); \(^1\)Purdue University

3:20 PM  
Influence of Tempering Treatment on Precipitation Behavior, Microstructure, Dislocation Density and Hydrogen Induced Ductility Loss in High Vanadium Hot-rolled X80 Pipeline Steel: Longfei Li\(^1\); Bo Song\(^1\); Zeyun Cai\(^1\); Zhenn Liu\(^1\); Xiaokang Cui\(^1\); \(^1\)University of Science & Technology Beijing

3:40 PM Concluding Comments
MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Crack Initiation and Propagation during Fatigue

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Thursday PM | March 14, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Garrett Pataky, Clemson University

2:00 PM Invited Initiation and Early Growth of Fatigue Cracks: Jaroslav Polak1; 1Institute of Physics of Materials

2:40 PM Fatigue Crack Growth in Pure Al Films: Syed Javaid2; Wade Lanning3; Christopher Muhlstein4; 1Georgia Institute of Technology

3:00 PM Fatigue Crack Growth Behavior of CrCoFeNiMn and CrCoFeNi High Entropy Alloys: Garrett Pataky1; William Williams1; Diana Burden1; Daniel Collins1; Samuel Jenkins1; Martha Piness1; 1Clemson University

3:20 PM Fatigue Life Assessment of Microstructurally-thin Pressure Vessel Metallic Liners: Jacob Hochhalter1; David Dawicke2; Timothy Ruggles1; William Leser3; Patrick Leser4; Heather Hickman5; Richard Russell6; 1University of Utah; 2Analytical Services & Materials, Inc.; 3National Institute of Aerospace; 4NASA Langley Research; 5NASA Glenn Research Center; 6NASA Kennedy Space Center

3:40 PM Break

4:00 PM Influence of the Stress Ratio on the Long Crack Propagation Behavior of Aluminum Wrighted Alloys in the Very High Cycle Fatigue Regime: Fatih Bulbul1; Marcel Wicke2; Tina Kirsten3; Angelika Brückner-Feit4; Martina Zimmermann5; Hans-Jürgen Christ6; 1Universität Siegen; 2Universität Kassel; 3Technische Universität Dresden

4:20 PM Investigation of Load Frequency Effect on Plasticity-induced Crack Closure during Fatigue and Creep-fatigue Crack Growth in Steels at High Temperatures: Jose J. Ramirez1; Gabriel Potirniche2; Robert Stephens3; Indrajit Charit4; Nicholas Shaber5; Martin Taylor6; 1University of Idaho

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Size Effects on Fracture Processes in Monolithic and Multilayer Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill. Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Thursday PM | March 14, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill. Erich Schmid Institute of Materials Science; Bo-Shiuan Li. University of Oxford

2:00 PM Invited Investigating Plasticity Effects on Fracture at the Microscale: The Ductile to Brittle Transition (DBT): Nathan Mara1; Kevin Schmalbach2; Youxing Chen3; Eric Hintzala4; William Gerberich5; 1University of Minnesota; 2Bruker Nano Surfaces Division

2:20 PM Understanding Brittle-to-ductile Transition Using Micro-fracture Tests and HR-EBSD: Bo-Shiuan Li1; David Armstrong2; Angus Wilkinson3; Steve Roberts4; 1University of Oxford

2:40 PM The Meso-scale Fracture Behavior of Single Crystalline Tungsten Nanolaminates: Angelica Saenz-Trevizol1; Chelsea Appleget2; Andrea Hodge3; 1University of Southern California

3:00 PM Can We Measure the Crack Length during in Elastic Plastic Fracture Reliably at the Micron Scale? A Case Study in Nanocrystalline Tungsten: Ashish Kumar1; Christoph Kirchlechner2; Steffen Brinckmann3; Gerhard Dehm4; 1Max-Planck-Institut für Eisenforschung GmbH

3:20 PM Impact of Internal Defects on the Deformation of Nanocrystalline Materials: Caizhi Zhou1; Sixie Huang2; 1Missouri University of Science and Technology

3:40 PM Break

4:00 PM Invited Enhanced Fracture Toughness of Mg/Nb Laminated Composites: Nan Li1; Youxing Chen2; Siddhartha Pathak3; Jian Wang4; Amit Misra5; Nathan Mara6; 1Los Alamos National Laboratory; 2University of Minnesota; 3University of Nevada, Reno; 4University of Nebraska-Lincoln; 5University of Michigan, Ann Arbor

4:20 PM Constituent Constraining Effects on the Microstructural Evolution and Fracture Behaviors of Crystalline/amorphous Nanolaminates: Yaqiang Wang1; Jinyu Zhang2; Gang Liu3; Jun Sun4; 1Xi’an Jiaotong University

4:40 PM Mechanical Deformation of AlN-Ag Nano Multilayers: Angelica Saenz-Trevizo1; Chelsea Appleget2; Andrea Hodge3; 1University of Southern California
MATERIALS PROCESSING

Friction Stir Welding and Processing X — Friction Stir Processing

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday PM | March 14, 2019
210B | Henry B. Gonzalez Convention Center

Session Chair: Rajiv Mishra, University of North Texas

2:00 PM Panel Discussion: Learn from Industrial Experts - What answers do they need from research?

3:00 PM Achieving Forced Mixing in Cu-based Immiscible Alloys via Friction Stir Processing: Mageshwari Komarasamy; Ryan Tharp; Subhashis Sinha; Saket Thapliyal; Rajiv S. Mishra; 1University of North Texas

3:20 PM Direct Application of Friction Stir Processing to Weld Toes of High-strength Low-alloy Steel Joints: Hajime Yamamoto; Yoshikazu Danno; Kazuhiro Ito; Yoshiki Mikami; Hidetoshi Fujii; 1Osaka University

3:40 PM Break

4:00 PM Exceptional Fatigue Strength in Cast Aluminum Alloy A339 Modified by Friction Stir Processing: Kaimiao Liu; Mageshwari Komarasamy; Rajiv Mishra; Glenn Grant; 1University of North Texas

4:20 PM Stationary Shoulder Friction Stir Processing: A Low Heat Input Grain Refinement Technique for Magnesium Alloy: Vivek Patel; Wenya Li; Quan Wen; Yu Su; Na Li; 1Northwestern Polytechnical University, Pandit Deendayal Petroleum University; 2Northwestern Polytechnical University

4:40 PM Friction Stir Processing (FSP) of Multiwall Carbon Nanotubes and Boron Carbide Reinforced Aluminum Alloy (Al 5083) Composites: Mithmoord Khan; Syed Husain; Shahid Akhtar; Ragnhild Aune; 1NTNU; 2Institute of Space Technology; 3Norsk Hydro

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Friction Stir Spot Welding

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday PM | March 14, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Yuri Hovanski, Brigham Young University; Jorge Dos Santos, Helmholtz-Zentrum Geesthacht

2:00 PM Panel Discussion: Learn from Industrial Experts - What answers do they need from research?

3:00 PM Invited Simulation of High Speed Refill Friction Stir Spot Welding in AA 6111: Michael Miles; Yuri Hovanski; J. Wu; B. Larsen; 1Brigham Young University

3:20 PM Invited Welding Multilayer Materials by Refill Friction Stir Spot Welding: Uceu Suhuddin; Dennis Gera; Nelson Alcantara; Jorge dos Santos; 1Helmholtz Zentrum Geesthacht; 2Federal University of São Carlos

3:40 PM Break

4:00 PM Invited Refill Friction Stir Spot Joining of Aerospace Aluminum Alloys with Additional Corrosion-inhibitive Compounds: Enthsalikh Boldsaikhan; Shintaro Fukada; Mitsuo Fujimoto; Kenichi Kamimuki; Hideki Okada; 1Wichita State University; 2Kawasaki Heavy Industries

4:20 PM Invited Friction Stir Spot Welding of Ti-6Al-4V Alloy Plates: Weldability, Microstructure, and Mechanical Integrity: Hyojin Park; Yong Chae Lim; Hahn Choo; Suhong Zhang; Anming Hu; Scott Rose; Zhili Feng; 1University of Tennessee; 2Oak Ridge National Laboratory; 3Boeing Research and Technology

4:40 PM Process Time Reduction in Friction Stir Spot Welded EN AW 1050 and EN CW 004A Dissimilar Joints: Tobias Köhler; Anna Regensburg; Michael Grätz; Moritz Loehlein; Jean Pierre Bergmann; 1Technische Universität Ilmenau
THURSDAY PM | March 14, 2019
007B | Henry B. Gonzalez Convention Center

Session Chairs: Louis Santodonato, Oak Ridge National Laboratory; Bernd Gludovatz, UNSW Sydney

2:00 PM
High Temperature Creep Behavior of Face-centered Cubic High Entropy Alloys: Min-Gu Jo1; Jin Yoo Suh1; Woo-Sang Jung2; Heung Nam Han3; 1Korea Institute of Science and Technology; 2Korea Institute of Science and Technology; 3Seoul National University

2:20 PM Invited
On Microstructure Optimization and Deformation Mechanisms at Different Strain Rates in a Precipitation Strengthened Eutectic High Entropy Alloy: Bhardwaj Gwalani1; Sindhura Gangireddy1; Rajiv S Mishra1; Rajarshi Banerjee1; 1University of North Texas

2:40 PM Invited
On the Fracture Behavior of TRIP, TWIP and Dual-phase High-entropy Alloys between RT and LN Temperatures: Bernd Gludovatz1; Yakasundery Maniandy1; Hyun Seok Oh2; Eun Soo Park2; Robert Ritchie1; 1UNSW Sydney; 2Seoul National University; 3Lawrence Berkeley National Laboratory

3:00 PM Invited
Dislocation and Atomic-scale Investigation of Deformation Mechanisms in High-entropy Alloy CoCrFeMnNi at High Strain Rates: Daniel Foley1; Shang-Hao Huang1; Elaf Anber1; Christopher Barr2; Andrew Lang3; Leslie Lamberson3; Mitra Taheri1; 1Drexel University; 2Sandia National Laboratories

3:20 PM Invited
A Comparative High Pressure Study of MoNbTaWV and Polycrystalline Tungsten: Shizhong Yang1; Tahy Delasbour2; Oleg Starovoytov1; David Young1; Ebrahim Khosravi1; Shengmin Guo1; 1Southern University and A&amp;M College

3:40 PM Break

4:00 PM Invited
High Entropy Alloys with Hexagonal Close-packed Structure Derived from Thin Film Combinatorial Approach: Artashes Ter-Isaakyan1; Azin Akbari1; Thomas Balk1; 1University of Kentucky

4:20 PM
On Exceptional Stability of Dislocations in HEAs from CoCrFeMnNi Family: Anna Fraczkiewicz1; Julia Olszewska1; Michal Proz1; Marc Legros1; 1Mines St-Etienne / Sms / Lgf Umr 5307; 2CEMES CNRS

5:00 PM
Refractory High Entropy Alloys Containing Non-metallic Elements: Aarai Roh1; Hanuel Kim1; Seungjin Nam1; Hyunjoo Cho1; Kookmin University

4:40 PM
Integrated Experimental and Computational Investigation of Strengthening in MnFeCoNi-based Alloys: Dongsheng Wen1; Chia-Hsii Chang1; Sae Matsunaga1; Michael Titus1; 1Purdue University

ADVANCED MATERIALS

High Entropy Alloys VII — Synthesis and Mechanical Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai. The University of Akron

Thursday PM | March 14, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Louis Santodonato, Oak Ridge National Laboratory; Bernd Gludovatz, UNSW Sydney

2:00 PM
High Temperature Creep Behavior of Face-centered Cubic High Entropy Alloys: Min-Gu Jo1; Jin Yoo Suh1; Woo-Sang Jung2; Heung Nam Han3; 1Korea Institute of Science and Technology; 2Korea Institute of Science and Technology; 3Seoul National University

2:20 PM Invited
On Microstructure Optimization and Deformation Mechanisms at Different Strain Rates in a Precipitation Strengthened Eutectic High Entropy Alloy: Bhardwaj Gwalani1; Sindhura Gangireddy1; Rajiv S Mishra1; Rajarshi Banerjee1; 1University of North Texas

2:40 PM Invited
On the Fracture Behavior of TRIP, TWIP and Dual-phase High-entropy Alloys between RT and LN Temperatures: Bernd Gludovatz1; Yakasundery Maniandy1; Hyun Seok Oh2; Eun Soo Park2; Robert Ritchie1; 1UNSW Sydney; 2Seoul National University; 3Lawrence Berkeley National Laboratory

3:00 PM Invited
Dislocation and Atomic-scale Investigation of Deformation Mechanisms in High-entropy Alloy CoCrFeMnNi at High Strain Rates: Daniel Foley1; Shang-Hao Huang1; Elaf Anber1; Christopher Barr2; Andrew Lang3; Leslie Lamberson3; Mitra Taheri1; 1Drexel University; 2Sandia National Laboratories

3:20 PM Invited
A Comparative High Pressure Study of MoNbTaWV and Polycrystalline Tungsten: Shizhong Yang1; Tahy Delasbour2; Oleg Starovoytov1; David Young1; Ebrahim Khosravi1; Shengmin Guo1; 1Southern University and A&amp;M College

3:40 PM Break

4:00 PM Invited
High Entropy Alloys with Hexagonal Close-packed Structure Derived from Thin Film Combinatorial Approach: Artashes Ter-Isaakyan1; Azin Akbari1; Thomas Balk1; 1University of Kentucky

4:20 PM
On Exceptional Stability of Dislocations in HEAs from CoCrFeMnNi Family: Anna Fraczkiewicz1; Julia Olszewska1; Michal Proz1; Marc Legros1; 1Mines St-Etienne / Sms / Lgf Umr 5307; 2CEMES CNRS

5:00 PM
Refractory High Entropy Alloys Containing Non-metallic Elements: Aarai Roh1; Hanuel Kim1; Seungjin Nam1; Hyunjoo Cho1; Kookmin University

4:40 PM
Integrated Experimental and Computational Investigation of Strengthening in MnFeCoNi-based Alloys: Dongsheng Wen1; Chia-Hsii Chang1; Sae Matsunaga1; Michael Titus1; 1Purdue University

ADVANCED MATERIALS

High Entropy Alloys VII — Thermal and Other Properties III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai. The University of Akron

Thursday PM | March 14, 2019
007B | Henry B. Gonzalez Convention Center

Session Chairs: Qing Wang, Dalian University of Technology; An-Chou Yeh, National Tsing Hua University

2:00 PM Invited
Martensitic Transformations and Shape Memory Characteristics of (TiZrHf)50Ni25Co10Cu15 High Entropy Shape Memory Alloy: Chih-Hsuan Chen1; Yue-Jin Chen1; 1National Taiwan University

2:20 PM
Microstructural Flexibility in Metastable High Entropy Alloys upon Friction Stir Processing: Saurabh Nene1; Michael Frank1; Subhasis Sinha1; Kiamiu Liu2; Rajiv Mishra3; Brandon Macwilliams3; Kyu Cho4; 1University of North Texas; 2U.S. Army Research Laboratory

2:40 PM
Thermal Stability of Low Neutron Cross-section Nb-Ti-V-Zr High-entropy Alloys for Nuclear Applications: Daniel King1; Simon Middleburgh2; Tim Lucey2; Michael Cortie3; Gregory Lumpkin4; Alexander Knowles5; 1Imperial College London; 2Bangor University; 3Weir Minerals; 4University of Technology Sydney; 5Australian Nuclear Science and Technology Organisation

3:00 PM Invited
High Throughput Solid Solution Strengthening Exploration of High Entropy Alloys: Francisco Couy1; Kester Clarke1; Claudio Kinninami1; Michael Kaufman1; Amy Clarke2; 1Colorado School of Mines; 2Universidade Federal de Sao Carlos

3:20 PM Break

3:40 PM Invited
Resistance-temperature Behavior of AlxCoCrFeNi High Entropy Alloy Films: Xiaona Li1; Chenyu Wang2; Qiang Meng3; Yue Ma4; Peter Liaw5; Chuang Dong6; 1Dalian University Of Technology; 2National Taiwan University; 3University of Tennessee

4:00 PM
Crystallographically Degenerate B2 Precipitation in a Plastically Deformed Fcc-based High Entropy Alloy: Deep Choudhuri1; Rajiv Mishra1; 1University of North Texas

4:20 PM
Elastic Dipoles of Point Defects in HEAs: Varvenne Celine1; Emmanuel Clouet2; 1CNRS Aix-Marseille University; 2CEA Saclay

4:40 PM
Entropy Contributions to Phase Stability in Concentrated Random Solid Solutions: Anus Manzoor1; Dipuneet Atyadi1; 1University of Wyoming
CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Interface-defect Interactions II

Sponsored by: The Minerals, Metals and Materials Society, TMS; Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Thursday PM | March 14, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: David Seidman, Northwestern University; Blas Uberuaga, Los Alamos National Laboratory

2:00 PM Invited
Grain Boundary Microscopic Degrees of Freedom: The Key(s) to Understanding Radiation Damage: Mitra Taheri; 1Drexel University

2:30 PM
Irradiation and Mechanical Behavior of Nanocrystalline Alloys with Amorphous Intergranular Films: Jennifer Schuler; 1Christopher Barr; 2Samuel Briggs; 3Nathan Heckman; 1Khalid Hattar; 1Brad Boyce; 1Timothy Rupert; 1University of California Irvine; 2Sandia National Laboratories

2:50 PM
Absorption of Radiation-Induced Point Defects at Crystal/Amorphous, Metal/Covalent Interfaces: Sanket Navale; 1Michael Demkowicz; 1Texas A&M University

3:10 PM
Helium Bubble Formation at Iron-oxide Interfaces in Nanostructured Ferritic Alloys: Tiberiu Stan; 1Yuan Wu; 1Jim Ciston; 1Takuya Yamamoto; 1G.R. Odette; 1Northwestern University; 1University of California Santa Barbara; 2Lawrence Berkeley National Laboratory

3:30 PM Break

3:50 PM
Molecular Dynamics Study of the Contact Behavior of FCC Metallic Substrates: Milad Khajehvand; 1Panthea Sepehrband; 1Santa Clara University

4:10 PM
High-strength Nanotwinned Al Solid Solution Alloys: Yifan Zhang; 1Qiang Li; 1Sichuang Xue; 1Jie Ding; 1Dongyue Xie; 2Cuncui Fan; 2Ruiithe Su; 1Jin Li; 1Han Wang; 1Haiyan Wang; 1Jian Wang; 1Xinghong Zhang; 1Purdue University; 2University of Nebraska-Lincoln

4:30 PM
Interactions of Interstitials with Coherent Twin Boundary in Al: A Comprehensive First-principles Study: William Yi Wang; 1Jin Sun; 1Chengxiong Zou; 1Quanmei Guan; 1Deye Lin; 1Jian Tang; 1Liang Zhang; 1Bin Tang; 1Jun Wang; 1Hongchao Kou; 1Jianying Hou; 1Jijin Ma; 1Jinshan Li; 1Northwestern Polytechnical University; 1CRRC Tangshan Co., LTD, Tangshan; 1Institute of Applied Physics and Computational Mathematics, Beijing; 2Shanghai Research Institutes of Materials

SPECIAL TOPICS

International Round Table on Materials Criticality — How Industry Manages Criticality

Sponsored by: ESM Foundation; co-sponsored by: The Federation of European Materials Societies

Program Organizer: Alessandra Hool, ESM Foundation

Thursday PM | March 14, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: Alessandra Hool, ESM Foundation

2:00 PM Introductory Comments
Round Table Discussion

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Small Scale Testing

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Atikaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Thursday PM | March 14, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Khalid Hattar, Sandia National Laboratory; Tarik Saleh, Los Alamos National Laboratory

2:00 PM Invited
An Overview of Small Scale Mechanical Property Measurements on Irradiated Steels: Tarik Saleh; 1Stuart Maloy; 1Takuya Yamamoto; 1Tobias Romero; 1Matthew Quintana; 1G. Odette; 1Los Alamos National Laboratory; 2University of California, Santa Barbara

2:30 PM
In Situ Micromechanical Testing of He2+ Ion Irradiated Ni and Ni Based Superalloys for Gen IV Nuclear Reactors: Dhriti Bhattacharyya; 1Alan Xu; 1Michael Saleh; 1Tao Wei; 1Mihail Ionescu; 1Australian Nuclear Science and Technology Organization

2:50 PM
Multiscale Modeling for Nanoindentation of Zirconium Using an Atomistic-to-continuum Coupling Method: Yuqing Ding; 1Vincent Bhakthavatsal; 1Sterling St Lawrence; 1Edmanuel Torres; 1Canadian Nuclear Laboratories

3:10 PM
Combined Nanomechanical and High-resolution Microscopy to Understand Plasma-surface Interactions in Fusion Energy Materials: Chad Parish; 1Kun Wang; 1Thomas Song; 1Matthew Baldwin; 2Russell Doerner; 1Oak Ridge National Laboratory; 2University of California San Diego
3:30 PM Break

3:50 PM The Effect of Helium-implantation on the Deformation Behaviour of Tungsten: X-ray Micro-diffraction & Crystal-plasticity: Suchandrima Das; Edmund Tarleton; Ruqing Xu; Wenjun Lui; Felix Hofmann; 1University of Oxford; 2Argonne National Laboratory

4:10 PM Micropillar Compression of Hydrogen Containing Zircaloy-4 at Temperatures to Explore the Performance of Nuclear Fuel Cladding: Siyang Wang; Finn Giuliani; Ben Britton; 1Imperial College London

4:30 PM Micromechanical Investigation of Irradiation Effects in Beryllium: Viacheslav Kuhsen; 1Chris Densham; 2Patrick Hurh; 3Steve Roberts; 4UK Atomic Energy Authority; 2Rutherford Appleton Laboratory; 2Fermi National Accelerator Laboratory; 1University of Oxford

4:50 PM Development of a Micropillar Compression Study for MAX Phases in Nuclear Applications: Julia Pürstl; 1Thomas Edwards; 2William Clegg; 1University of Cambridge; 2Swiss Federal Laboratories for Materials Science and Technology (EMPA)

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocomposites II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Thursday PM | March 14, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Antonia Antoniou, Georgia Institute of Technology; Siddhartha Pathak, University of Nevada, Reno

2:00 PM Invited
Understanding Plasticity of Nanoscale Al-Al2Cu Eutectic: Jian Wang; Shujuan Wang; Guisien Liu; Amit Misra; 1University of Nebraska–Lincoln; 1University of Michigan; 2University of Nebraska, Lincoln

2:30 PM Breakdown of the Superplastic Behaviour of Zn-22Al at the Nanoscale: Mathias Göken; Patrick Feldner; Benoit Merle; 1Friedrich Alexander, University Erlangen Nürnberg

2:50 PM Influence of Interface Structure and Chemistry on the Mechanics of Finite Cracks of Phase Boundaries under Irradiation: Remi Dingreville; Elton Chen; Chaitanya Deo; 1Sandia National Laboratories; 2Georgia Institute of Technology

3:10 PM Mechanical Behavior of Core-shell Nanostructures: Rajghuram Santhapura; Douglas Spearot; Arun Nair; 1University of Arkansas; 2University of Florida

3:30 PM Break

3:50 PM Invited
Deformation Behavior and Strength of Bulk Zr/Nb Nanolayered Composites: Marko Knezevic; Daniel Savage; Nan Li; Jordan Weaver; Nathan Mara; Rodney McCabe; Sven Vogel; Irene Beyerlein; 1University of New Hampshire; 2Los Alamos National Laboratory; 3National Institute of Standards and Technology; 4University of Minnesota; 5University of California at Santa Barbara

4:20 PM DFT Study of High Order Elastic Constants and Electronic Properties of Borophene: Ali Ramazani; Mahdi Faghhihinasiri; Homayoun Jafari; Mostafa Shabani; Sina Malakpour Estalaki; Ronald G Larson; 1Massachusetts Institute of Technology; 2Young Researchers and Elite Club; 3Iran University of Science and Technology; 4Shahrood University of Technology; 5University of Notre Dame; 6University of Michigan, Ann Arbor

4:40 PM Invited
Unraveling Material and Geometrical Effects in Nanoporous Plantinum: Antonia Antoniou; 1Georgia Institute of Technology

NANOARCHITECTURED AND MORPHOLOGY-CONTROLLED MATERIALS

Nanoprocessed and Morphology-controlled Nanoporous Materials — NP Materials-structure Properties-mechanical Behavior II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Thursday PM | March 14, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Xinghang Zhang, Purdue University; David Bahr, Purdue University

2:00 PM Invited
Novel Deformation Mechanism of Small-volume Copper Containing High Density of Helium Bubbles: Weizhong Han; 1Xi’an Jiaotong University

2:30 PM Characterization of Nanoporous Metals after Nanoindentation through 3D Reconstruction: Nicholas Briot; 1T. John Balk; 2University of Kentucky

2:50 PM Invited
In Situ Irradiation Studies of Nanoporous Metals: Xinghang Zhang; Jin Li; Cuncai Fan; 1Purdue University

3:20 PM Break

3:50 PM Invited
Microstructure Evolution of Nanoporous Gold during Dealloying: Insights from Atomistic Modeling: Dinh Bao Nam Ngoc; Yong Li; Jürgen Markmann; Jörg Weissmüller; Jörg Weissmüller; 1Helmholtz-Zentrum Geesthacht; 1Hamburg University of Technology

4:20 PM Invited
Copper-nickel Alloy Foams from Polymer Templates: David Bahr; Changseun Kim; Raheleh Rahimi; Ioannis Mastorakos; 1Purdue University
4:50 PM
Real-time USAXS and WAXS Studies of Morphology Evolution in 3D Nanoporous Gold during Electrochemical Dealloying: Sam Welborn1; John Corsi2; Alexander Proschel1; Eric Detsi3; 1University of Pennsylvania

5:10 PM
3D-morphology of Multimodal Porous Cu Fabricated via Chemical De-alloying Method: Lijie Zou1; Miyunguan Ge2; Chonghang Zhao2; Wah-Keat Lee2; Fei Chen2; Yu-chen Karen Chen-Wiegart2; 1Stony Brook University; 2Brookhaven National Laboratory; 3Wuhan University of Technology

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys V

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas; Sophie Primig, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Thursday PM | March 14, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Megumi Kawasaki, Oregon State University; Hugo Lopez, University of Wisconsin

2:00 PM
Size Effect of NbTi Filament on the Interfacial Reaction and Properties of Lead-free Superconducting Solder Joints: Sangeeta Santra1; Timothy Davies2; Junliang Liu3; Guillaume Matthews4; Chris Grovenor5; Susanna Speller6; 1University of Oxford

2:20 PM
Study of Phases Demonstrating Potential Hardening Effect in New Nickel-base Superalloys for Turbine Discs Application: Laurane Finet1; Vladimir A. Esin2; Loïc Nazé3; Vincent Maurel5; 1Mines ParisTech, PSL Research University

2:40 PM
The Effect of Pre-stretch Deformation on the Precipitation and Microstructural Evolution in Zircaloy-4 Alloy during Aging: Shuo Li1; Baireng Luan2; Qing Liu3; 1Chongqing University

3:00 PM
The Influence of Hot Deformation and Subsequent Aging on the Mechanical Properties of the Nickel Superalloy 625: Simon Malej1; Jožef Medved2; Barbara Šetina Batic3; Franc Těhovník1; Jaka Burja1; Franc Vode1; Arč Boštjan1; Matjaž Godec1; 1Institute of Metals and Technology; 2Faculty of Natural Sciences and Engineering

3:20 PM Break

3:30 PM
Precipitation Mechanism of Irradiation Induced Nb-rich Particles in ZrNb Alloys: Zefeng Yu1; Adrien Couet1; Mukesh Bachhav2; 1University of Wisconsin, Madison; 2Idaho National Laboratory

4:00 PM
Structural Evolution of Dislocation Dipoles and Their Strengthening Effect in Deformed Gamma-TiAl: Hao Wang1; Yan He2; Zhao Liu3; Gang Zhao4; Chunguang Bai5; David Rodney6; Fritz Appelt7; Dongsheng Xu8; Rui Yang9; 1Institute of Metal Research, Chinese Academy of Sciences; 2Institut Lumiére Matière, Université Lyon 1; 3Institute for Materials Research, Helmholtz-Zentrum Geesthacht

4:20 PM
Thermal Decomposition of Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: Hannah Leonard1; Sarshad Rommel2; Sriram Vijayan3; Thomas Watson4; Sonia Tulyani5; Mark Aindow6; 1University of Connecticut; 2Pratt & Whitney; 3UTC Aerospace Systems

4:40 PM
The Formation of Faceted Spirals during Directional Eutectic Solidification: Saman Moniri1; Ashwin Shahani2; 1University of Michigan

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics III: Functional Materials and Devices

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Wenchao Zhou, University of Arkansas

Thursday PM | March 14, 2019
217D | Henry B. Gonzalez Convention Center

Session Chairs: Anming Hu, University of Tennessee; Yong Kong, The University of Utah

2:00 PM Invited
In Situ Real Time Defect Detection and Residual Stress Measurement in Additive Manufacturing: Xiaodong Li1; 1University of Virginia

2:30 PM
Advances in 2D Material Processing and Application: A Direct-out Writing Approach Employing Graphene-based Inks for Flexible Gas Sensor Patternning and Fabrication: Harrison Loh1; Andrew Graves1; Charter Stinespring1; Konstantinos Sierros2; 1West Virginia University

2:50 PM
Materials Integration for Flexible Electronics: Transparent Supercapacitors: Lydia Skrolrod1; Tolga Aytug2; Matthew Rager1; Forrest Brown1; Wesley Higgins1; Gabriel Veith1; Hui Wang2; Zachary Hood3; Christopher Rouleau4; Pooran Joshi2; 1Oak Ridge National Laboratory

3:10 PM
Aerosol Jet Printing of Dielectric Polymer Blend for Applications in Flexible CNT Thin Film Transistors: Alan Phillips1; Yongchao Yu2; Justine Valka1; Nance Ericson1; Pooran Joshi2; 1Oak Ridge National Laboratory; 2University of Tennessee
3:00 PM Break
3:15 PM Keynote
Ultra-low-energy Ion Beam Synthesis for Nanotechnology and Nanostructures. Marzia Carrada; Caroline Bonafos; P. Benzo; Gérard Ben Assayag; B. Pecassou; CEMES
3:50 PM Break
4:10 PM
Structural and Optical Properties of Silicon Doped Quantum Dots in Silicon Oxynitride Thin Films Prepared by Plasma Enhanced CVD. Gerald Ferblantier; Fabien Ehrhardt; Dominique Muller; Daniel Mathiot; Icube Laboratory
4:30 PM
Engineering Interfacial Stresses For Optimum Silicon Band-Edge emission. Sufian Abedrabbo; Nuggehalli Ravindra; Anthony Fiory; Khalifa University of Science And Technology; New Jersey Institute of Technology
4:50 PM
Uncooled Microbolometers – An Overview. Sita Rajyalaxmi Marthi; Asahel Bañobre; Nuggehalli Ravindra; New Jersey Institute of Technology

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings III

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Nancy Michael, University of Texas Arlington; Gerald Ferblantier, Icube Laboratory; Heinz Palkowski, Clausthal University of Technology; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Thursday PM | March 14, 2019
Z17A | Henry B. Gonzalez Convention Center

Session Chairs: Gerald Ferblantier, Strasbourg University; Chintalapalle Ramana, University of Texas El Paso

2:00 PM Keynote
High Resolution Ion Beam Analysis of Materials: Past, Present and Future. Vaithiyalingam Shutthanandan; Pacific Northwest National Laboratory

2:35 PM
Evaluation of Transparent WO3/Mo/WO3 Multilayer Thin Films: Alba Leyva; Anil Krishna Battu; Nanthkishore Makeswaran; Ramana Chintalapalle; University of Texas, El Paso

2:55 PM
Effect of Refractory Metal Incorporation on Structure and Properties of β-Ga2O3: A Case Study of Molybdenum Incorporated β-Ga2O3 Films: Anil Krishna Battu; Cristian Orozco; Ramana Chintalapalle; University of Texas, El Paso
POSTER SESSIONS

POSTER SESSIONS WITH PRESENTERS
The poster sessions are divided into 2 separate presentation times and grouped by topic area.

POSTER SESSION I
Monday, March 11
5:30 to 7:00 p.m.
Additive Technologies
Biomaterials
Corrosion
Light Metals
Materials Processing
Mechanics and Structural Reliability
Nuclear Materials
Special Topics

POSTER SESSION II
Tuesday, March 12
5:30 to 7:00 p.m.
Advanced Materials
Energy & Environment
Characterization
Electronic Materials
Materials Design
Nanostructured & Heterostructured Materials
Physical Metallurgy

Poster presenters should stand by their poster during their designated presentation time.
E-49: A Literature Review of Heat Capacity Measurement Methods: Guishang Pei; Junyi Xiang; Gang Li; Shanshan Wu; Feifei Pan; Xuewei Lv; 1Chongqing University

E-50: A Study on the Supersonic Jet Behavior for the Improvement of Dephosphorization Efficiency in Converter Process: Jeong Han; 1Inha University

E-51: Application of Offgas Analysis on Predicting Carbon Content of End-point during Steelmaking Process: Rong Cheng; Jiongming Zhang; Shaoqun Guo; 1University of Science and Technology Beijing

E-52: Calcination of Strontium Carbonate in Rotary Kiln Furnace: Rasit Sezer; Emre Yilmaz; Selim Erturk; Cuneyt Arslan; 1Karadeniz Technical University; 2Istanbul Technical University

E-53: CFD Study on Pulverized Coal Combustion Behavior in the Raceway of an Oxygen Blast Furnace: Juming Wu; Zhenfeng Zhou; Xing Peng; Jingsong Wang; 1University of Science and Technology Beijing

E-54: Determination of Effect of Li2O on the Structure of CaO-Al2O3 Based Slag by Molecular Dynamics Simulation and Raman Spectrum: Sai Wang; Shengping He; Boran Jia; Qian Wang; 1Chongqing University

E-55: Dissolution Reaction of Earthy Graphite in Liquid Steel: Hongyan Yan; XiaoJun Hu; Chao Luo; JiongLong Liang; KuoChih Chou; 1College of Metallurgy and Energy, North China University of Science and Technology; 2State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing; 3Hesteel Group Tangsteel Company

E-56: Effect of Al on the Formation of IAF in Al-Ti-Mg Deoxidized and RE-treated Steel: Xiaokang Cui; Bo Song; Zhen Liu; Longfei Li; 1University of Science & Technology Beijing

E-57: Effect of H2/CO Ratio on Gas Consumption and Energy Utilization Rate of Gas-based Direct Reduction Process: Chenyang Xu; Zheng Anyang; Zhang Jianliang; Wang Rongrong; Li Yang; Wang Yaou; Liu Zhengjian; 1University of Science and Technology Beijing

E-58: Effects of Particle Size of Coke on Iron Ore Sintering Process: HuaYing Ma; Wen Pan; Lei Liu; Zhidong Zhang; Chunlai Wang; 1Research Institute of Technology, Shougang Group Corporation; 2Shougang Qian’an Steel Company

E-59: Electrical Conductivity of TiO2-FeO-XSiO2, CaO Ternary High Titania Slag: Kai Hu; Shengqing Li; Junyi Xiang; Xuewei Lv; 1Chongqing University

E-60: Experimental Study on Dechlorination of Cold-rolling Sludge at High Temperature Roasting: Yi Li; Hongwei Cheng; Guangshi Li; Xiaoyong Mei; Xionggang Lu; Qian Xu; 1Shanghai University

E-61: Extraction Process of Antimony from Stibnite by Electrothermal Volatilization: Dongbo Li; Xiaohua Yang; 1China ENFI Engineering Corporation

E-62: Generation Kinetics of Perovskite in Calcium Ferrite-titania Reaction: Cheng Yi Ding; Gang Li; 1Chongqing University

E-63: Influence Factors Analysis on Scavenging of Chlorine Impurity from Crude Titanium Sponge: Li Liang; Dachun Liu; 1Panzhihua Iron&Steel Research Institute; 2Kunming University of Science and Technology

E-65: Low Grade Phosphorus-containing Iron Ore for the Removal of Cu(II) Ion from Wastewater: Xiaoli Yuan; Dongshan Zhou; Wentang Xia; Qingyun Huang; 1Chongqing University of Science and Technology

E-66: Mechanism of the Chlorination Roasting of Nickel Sulfide Concentrate with Ammonium Chloride: Xiaoyong Mei; Hongwei Cheng; Cong Xu; Guangshi Li; Xionggang Lu; Qian Xu; 1Shanghai University

E-67: Numerical Simulation Investigation on the Flow and Temperature Fields in Tundish with Gas Injection into Ladle Shroud: Wang Zhour; Tao Zhang; San-Xing Chen; 1Chongqing CEPREI Industrial Technology Research Institute; 2Chongqing University of Education

E-68: Rapid Surface Quenching Technology and its Computing Model of Micro-alloy Steel: Cheng Juan; Yang Qiankun; Wang Yang; Zhang Dong; Shen Ping; Fu Jianxun; 1Shanghai University

E-69: Recovery of Zinc from Oxide-sulphide Zinc Ore through Oxidation and Chelation: Kun Yang; Shwei Li; Li Bo; Zhong Jinhui; Peng Jiu; 1Kunming University of Science and Technology

E-70: Roasting Behavior and Mechanism of Oxidized Pellets by Blended Hematite and Magnetite Concentrate: Zhang Zhongwu; Yu Zhengwei; Xiang Aiping; Li Yafei; Lei Jie; Long Hongming; 1Anhui University of Technology

E-71: Structure-property Correlations of Al2O3SiO2 Substitution in Blast Furnace Slag: Ziming Yan; Xuewei Lv; Ramana Reddy; Zhengde Pang; Wenchao He; 1Chongqing University; 2The University of Alabama

E-72: Optimization of Continuous Casting Process of 23MnNiCrMo54 Steel: Yang Wang; Ping Shen; Juan Cheng; Qiankun Yang; Dong Zhang; Jianxun Fu; 1Shanghai University

E-73: Study of Surface Temperature of Continuously Cast Slab by Machine Vision: Junpeng Liu; Ke Xu; Dongdong Zhou; Peng Zhou; 1University of Science & Technology Beijing


E-75: Study on the Effect of Different CO2-O2 Mixture Gas Blowing Modes on Vanadium Oxidation: Zhenglei Guo; Yu Wang; Qi Lu; Shuchao Wang; 1Chongqing University

E-76: The Effects of Solute and Particles on the Microstructure Changes during Directional Annealing in an Ni-Al System: Chao Yang; Ian Baker; 1Thayer School of Engineering at Dartmouth College

E-77: Thermodynamic Analysis of Precipitation of La-O-S-As Inclusions in Steel: Congxiao Li; Hongpo Wang; Bin Bai; Lei Zhang; 1Chongqing University
**SPECIAL TOPICS**

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Student Poster Session

**Sponsored by:** TMS Extraction and Processing Division

**Program Organizers:** Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

**Monday PM | March 11, 2019**
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Funding support provided by: Korean Institute of Metals and Materials

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**H-1: Corrosion Behavior Mechanism of Super Duplex-stainless Steel in Simulated Seawater Desalination Environment:** Yangang Zhang; Zhangfu Yuan; Xiangtao Yu; ¹University of Science and Technology Beijing

**H-2: Development of Bio Treated-oil Palm Fiber Reinforced Kaolin Matrix Composites for Building Bricks Application:** Mudeen Adebayo Bodude; Olasunkanmi Adegbuyi; Nnaji Ruth Nkiruka; ¹University of Lagos

**H-3: Effect of Roll Surface Profile on Thermal-mechanical Behavior of Continuously Cast Bloom in Soft Reduction Process:** Liang Li; Xiaozhao; Peng Lan; Zhanpeng Tie; Haiyan Tang; Jiaquan Zhang; ¹University of Science and Technology Beijing

**H-4: The Influence of Bath Additives on the Microstructure, Mechanical Properties and Thermal Stability of Nanocrystalline Ni Films Processed by Electrodeposition:** Tamás Kolonits; Zsolt Czigány; László Péter; Imre Bakonyi; Jeno Gubicza; ¹ELTE Eötvös Loránd University; ²Institute of Technical Physics and Materials Science, Hungarian Academy of Sciences; ³Wigner Research Centre for Physics, Hungarian Academy of Sciences

**H-5: Thermodynamic Study on Substitution of CO2 for Ar or O2 in AOD Smelting Process:** Rongyue Wang; Zhangfu Yuan; Xiangtao Yu; Jingxiao Liu; ¹University of Science and Technology Beijing; ²Peking University

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**SPECIAL TOPICS**

2019 Technical Division Student Poster Contest — Functional Materials Division (FMD) Graduate Students

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

**Monday PM | March 11, 2019**
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Funding support provided by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Structural Materials Division

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**SPG-1: Dissolution Behavior of ZnFe2O4-Fe3O4 Spinell Solid Solutions in Acid:** Marian Nida Lumongsood; Kazuaki Hara; Takahiro Miki; Yasushi Sasaki; Tetsuya Nagasaka; ¹Tohoku University

**SPG-2: Optimization of Platinum Leaching from Spent Catalysts Using Response Surface Methodology:** Yunji Ding; Shengen Zhang; ¹University of Science and Technology Beijing

**SPG-3: Thermochemical and Electrochemical Properties of Nd-Bi Alloys by Electromotive Force and Complementary Measurements:** Timothy Lichtenstein; Nadia Elbaar; Hojong Kim; ¹Pennsylvania State University

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**SPG-4: A First-principles Exploration of the Effects of Supercell Size, Exchange-correlation Functional, and Vibrational Entropy on Self-diffusion in FCC Metals:** John O’Connell; Chelsey Hargather; Kristin Mackowski; ¹New Mexico Institute of Mining &Technology

**SPG-5: Thermophysical Properties Characterization of a Novel Multicomponent Molten Salt:** Matías Castro; Daniel Faundez; Nissim Deij; Cristobal Martinez; Alvaro Videla; ¹Pontificia Universidad Católica de Chile

**SPG-6: Thickness Controlled Graphene Growth on Textured Cu-Ni (CuNxNi1-x, x = 0.5 – 1.0) Alloy Foils:** Gurjinder Kaur; Vijayesh Kumar; K.S. Suresh; Indranil Lahiri; ¹Nano Materials and Applications Lab, Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee; ²Centre of Excellence: Nanotechnology, Indian Institute of Technology Roorkee; ³Department of Metallurgical and Materials Engineering Indian Institute of Technology Roorkee
**SPECIAL TOPICS**

**2019 Technical Division Student Poster Contest — Functional Materials Division (FMD) Undergraduate Students**

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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**SPU-2:** Atomic and Electronic Structure of Perovskite Surface and Interfaces for Photovoltaic Applications: Nicholas Ayers; Anirban Naskar; Rabi Khanal; Samrat Choudhury; University of Idaho

**SPU-3:** Coating Porous-wall, Hollow Glass Microspheres for Security Printing Applications: Jordan Brito; Forest Thompson; Grant Crawford; Texas A&M University; South Dakota School of Mines & Technology

**SPU-4:** Effect of Varying Time and Temperature on Carbon Nanotube Growth: Tyler Knapp; Jud Ready; Georgia Tech Research Institute

**SPU-5:** Electrodeposition of Tungsten Oxide Hydrates on 2D and 3D Substrates for High Power Electrochemical Energy Storage: Ellie Scott; James Mitchell; Veronica Augustyn; North Carolina State University

**SPU-6:** Exploring Different Methods to Increase Efficiency of CZTS Solar Cell Applications: Lily Turashk; Jud Ready; Georgia Institute of Technology; Georgia Tech Research Institute

**SPU-7:** Simulating Oxygen Vacancies in Energy Materials: Benjamin Shindel; Peter Crozier; Ethan Lawrence; Tara Boland; Arizona State University

**SPU-8:** The Effect of the Substrate on the MoS2 Catalyzed Hydrogen Evolution Reaction: Grace Matthews; North Carolina State University

**SPU-23:** Developing a Compact Neutron Beam Radiography and 3D Tomography System for Non-Destructive Material Characterization: Calvin Downey; Worcester Polytechnic Institute

**SPU-24:** Enhanced Efficiency of Non-toxic, Easily-processable BiI3 Thin Film Solar Cells Using Close-space Sublimation to Achieve Highly Controllable Crystal Orientation: Emily Molstad; Worcester Polytechnic Institute

**SPU-25:** Metal Oxide Photoelectrodes for Water Decontamination: Salvador Alvarado Olivo; Worcester Polytechnic Institute

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**2019 Technical Division Student Poster Contest — Light Metals Division (LMD) Graduate Students**

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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**SPG-7:** Conventional and Low Phosphorous Ceramic Foam Filters (CFFs) - Chemical Reactivity and Thermal Stability: Are Bergin; Robert Fritzsch; Shahid Akhtar; Lars Arnborg; Ragnhild E. Aune; Norwegian University of Science and Technology & Hydro ASA; Norwegian University of Science and Technology; Hydro ASA

**SPG-8:** Effect of Elastic/Plastic Strain on Corrosion Behavior of Aluminum Alloy 7075: Hamidezra Habibollahi Najaf Abadi; Brendy Rincon Troconis; University of Texas at San Antonio

**SPG-9:** Formation of Alumina Rafts in a Lab Scale Furnace: Sindre Engzelius Gyler; Kristian Einarsrud; Norwegian University of Science and Technology

**SPG-10:** Oxidation of AlMgSi Alloys in CO2 - Air Atmospheres: Cathrine Solem; Gabriella Tranell; Ragnhild E. Aune; Norwegian University of Science and Technology

**SPG-11:** Modeling of the Effect of Porosities and Powder Particle of Additive Manufacturing Materials: Md Salah Uddin; Brahmananda Pramanik; Montana Technological University

**SPG-12:** Oxidation of AlMgSi Alloys in CO2 - Air Atmospheres: Cathrine Solem; Gabriella Tranell; Ragnhild E. Aune; Norwegian University of Science and Technology (NTNU)

**SPG-13:** Study of Confined Rolling of Magnesium Alloys to Improve Mechanical Properties: Pavitra Krishnan; Zhigang Xu; Sergey Yarmolenko; Jag Sankar; Laszlo Kecskes; Qiuming Wei; UNCC; NC A&T University; HEMI, JHU

**SPG-14:** Ultrastrong, Deformable and Thermally Stable Nanosstructured Al Alloy Coatings with Solute Supersaturation: Qiang Li; Xinghang Zhang; Jian Wang; Shuai Shao; Haiyan Wang; Purdue University; University of Nebraska-Lincoln; Louisiana State University

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**SPECIAL TOPICS**

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**SPU-9:** Aluminum-cerium Alloys Treated with Niobium Diboride Nanoparticles for Aerospace Applications: Julie Colon; Manny De Jesus; Carolina Ramos; Raúl Vega; Oscar Marcelo Suárez; University of Puerto Rico Mayaguez
2019 Technical Division Student Poster Contest — Materials Processing and Manufacturing Division (MPMD) Graduate Students

**SPG-15:** Aluminizing of Austenitic Stainless Steel - Thermodynamic and Kinetic Modeling: Deepali Patil; Vilupanur Ravi; 1California State Polytechnic University, Pomona

**SPG-16:** Characterization of Steel Powder Produced from Battlefield Scrap for Additive Manufacturing: Christopher Massar; Bryer Sousa; 2Worcester Polytechnic Institute

**SPG-17:** Effect of Heat Treatment on Selective Laser Melted Alloy 625: Microstructure and Corrosion Behavior: Christopher Foraj; Samad Firdoss; Andre Pate; Vilupanur Ravi; 1California State Polytechnic University, Pomona; 2Jet Propulsion Laboratory, California Institute of Technology

**SPG-18:** Experimental Characterization and Modelling of Aluminum Alloy AA3103 for Complex Single and Double Strain-path Changes: Jisheng Qin; 1OSU

**SPG-19:** Extrusion Based 3D Printing of Metallic and Ceramic Scaffolds Using Particle-based Liquid Inks: Kameswara Pavan Ajjarapu; Safa Khodabakhsh; Ashley Paz y Puente; 1University of Cincinnati

**SPG-20:** Fabrication of Ni-Ti-Zr Shape Memory Microwires via Co-deposition of Ti and Zr on Pure Ni Wires: Ajith Achutananthup; Arun Bhattacharjee; Ashley Paz y Puente; 1University of Cincinnati

**SPG-21:** Improving the Microstructure of LPBF IN718 through Supersolus Solution Treatment: David Newell; Ryan O’Hara; Greg Cobb; Anthony Palazzotto; 1Air Force Institute of Technology; 2ORISE

**SPG-22:** Mini-fatigue Testing of a Laser Additive Manufactured IN-625 Alloy: Shivankant Shukla; Mageshwari Komarasamy; Kumar Kandasamy; Rajiv Mishra; 1University of North Texas; 2Oerlikon Metco

**SPG-23:** Predictive Finite Element Simulations of Grain Growth: Erdem Eren; Jeremy Mason; 1University of California, Davis

**SPG-24:** Probabilistic Methodology for the Analysis and Reconstruction of Parent Microstructures from EBSD Maps of Transformation Products: Alexander Brust; 1Ohio State University

**SPG-25:** Study of Al11Ce3 Distribution in Aluminum Matrix Produced via Centrifugal Casting: Manny de Jesus; Lopez; William Crespo-Martinez; Angel Torres-Gonzalez; Karina Ramos-Ortiz; Oscar Suarez; 1University of Puerto Rico, Mayaguez

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2019 Technical Division Student Poster Contest — Materials Processing and Manufacturing Division (MPMD) Undergraduate Students

**SPU-10:** Heat Treatment Optimization of Al-Ce Based Alloys Using Differential Scanning Calorimetry: Ramon Padín; Manny De Jesus; O.M. Suarez; 1University of Puerto Rico at Mayaguez

**SPU-11:** The Effect of Fibrous Geometry on Thermomechanical Behavior of Phenolic Impregnated Carbon Ablators for Use in Thermal Protection Systems: Katherine Moody; Skylar Mays; Mujan Seif; Matthew Beck; 1University of Kentucky

**SPU-12:** Alginate Particle Fabrication Using Vibration Assisted Drop Generation: Brandon Wells; Alejandro Alcaraz Ramirez; Carlos Martinez; 1Purdue University

**SPU-13:** Anodizing Bicycle Spokes in Hot Sodium Hydroxide: Sara Franco; Eric Galindo; T. David Burleigh; 1New Mexico Institute of Mining & Technology

**SPU-14:** Fabrication of a Porous Zn Metal Via Selective Dissolution of an Al-Zn Alloy in NaOH Aqueous Solutions: Kenneth Silvo-Reyes; Juan Carlos Vargas-Martinez; Keishlyann Baez-Cruz; Johnathan Velazquez-Diaz; Oscar Marcelo Suarez; 1University of Puerto Rico, Mayaguez

**SPU-15:** Improvements to the Production of Tungsten Carbide through the Mathematical Modeling and Statistical Optimization of Production Parameters: Marc D’Aberle; Jeremy Downey; Grant Wallace; Jannette Chorney; Katie Schumacher; 1Montana Tech of the University of Montana

**SPU-16:** Investigation of the Effect of Laser Power on Defects, Texture, and Tensile Behavior of Additively Manufactured 316L Stainless Steel Using In-situ Synchrotron X-ray Computed Tomography and Diffraction: Logan White; 1University of Tennessee Knoxville

**SPU-17:** Size Effect in Microparticle Impact Bonding: Ian Dowding; Mostafa Hassan-Gangaraj; David Veysey; Christopher Schuh; 1North Carolina State University; 2Massachusetts Institute of Technology
SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Structural Materials Division (SMD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019
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SPG-28: Creep Behavior of a Precipitation Hardened Complex Concentrated Alloy. Priyanshi Agrawal1; Bharat Gwalani1; Mageshwari Komarasamy1; Rajiv Mishra2; Rajarshi Banerjee2; 1University of North Texas

SPG-29: Development of Fe-9Cr ODS Alloy via High Energy Ball Milling and Spark Plasma Sintering for Fast Reactor Cladding Material: Arnab Kundu1; Nathan Jerred1; Indrajit Chari1; 1University of Idaho

SPG-30: Digital Volume Correlation Applied in Strain Mapping of Shoulder Bone Under Loading. Yuxiao Zhou1; Chujie Gong1; Gregory Lewis1; April Armstrong1; Jing Du1; 1Pennsylvania State University

SPG-31: Hydrogen Behaviour in a Duplex Stainless Steel. Zoha Ghorani1; Goroh Itoh1; Afshin Yousefi1; 1Ibaraki University

SPG-32: Influence of γ’-γ” Co-precipitation on the Mechanical Properties and Coarsening Kinetics of IN718 Variant Superalloys. Semanti Mukhopadhyay1; Christopher Zenk1; Lonsheng Feng1; Robert Hayes1; Richard DiDomizio1; Mallikarjun Karadge1; Yunzhi Wang1; Michael Mills1; 1Ohio State University

SPG-33: Interfacial Reactions in the Sn-9Zn Solder and Cu-Be Alloy (Alloy 25) Couples. Kuo Jung Chen1; Jing Shiun Chang1; Yu-Chun Li1; Yee-wen Yen1; 1National Taiwan University of Science and Technology

SPG-34: Machine Learning Predictions of Irradiation Embrittlement. Yu-chen Liu1; Henry Wu1; Tam Mayeshiba1; Benjamin Afflebert1; Ryan Jacobs1; Josh Perry1; Jerit George1; Josh Cordell1; Jinyu Xia1; Hao Yuan1; Aren Lorenson1; Haotian Wu1; Matthew Parker1; Fenil Doshi1; G. Robert Odette1; Dane Morgan1; 1National Cheng Kung University; 2University of Wisconsin-Madison; 3University of California, Santa Barbara

SPG-35: Magnetic and Nanostructural Investigation of Magnetite Nanoparticles at High-Temperatures up to 800 °C for Nuclear Applications. Lokendra Khanal1; Mostafa Ahmadzadeh2; John McCloy2; You Qiang3; 1University of Idaho; 2Washington State University

SPG-36: Microstructures and Mechanical Properties of a 3D Printed Ti-6Al-4V Alloy. Punit Kumar1; Upadrasama Ramamurthy1; 1Indian Institute of Science Bangalore; 2Nanyang Technological University

SPG-37: Multi-scale Mechanical Behavior of Three-dimensional Graphene Foam-based Shape Memory Epoxy Composites. Adeviintha Idowu1; Pranjal Nautiyal1; Mitchell Hopper1; Benjamin Boes1; Arvind Agarwal1; 1Florida International University

SPG-38: Predicting Complete Microstructural Evolution in Ni-based Single Crystal Superalloys: Harikrishnan Rajendran1; Jean-Briac le Graverend1; 1Texas A&M University

SPG-39: Prediction of Metallic Glass Formation Regions of the Al-Ni-Zr Ternary System Using Calculation of Phase Diagram Method. Chio-Yu Liu1; Yung-Chin Lan1; Po-Cheng Kuo1; Yee-wen Yen1; 1National Taiwan University of Science and Technology

SPG-40: Properties and Performance of Additive Manufactured Titanium with TiB Reinforcement. Liza-Anastasia DiCecco1; Afsaneh Edrisy1; 1University of Windsor

SPG-41: Self-consistent Description of Metastable Phase Competition during Devitrification of Al-Sm Binary Alloy. Shubhra Jain1; Shihuai Zhou1; Faqiang Meng1; Ralph Napolitano1; 1Department of Materials Science and Engineering, Iowa State University; 2Division of Materials and Engineering, Ames Laboratory, DOE

SPG-42: Thermal Stability of Ultrafine-grained FeCrAl Alloy Processed by Equal-channel Angular Pressing or High-pressure Torsion. Madavan Arivu1; Andrew Hoffman1; Jiaqi Duan1; Haiming Wen1; 1Department of Materials Science and Engineering, Missouri University of Science and Technology; 2Department of Nuclear Engineering, Missouri University of Science and Technology; 3Department of Materials Science and Engineering, Department of Nuclear Engineering, Missouri University of Science and Technology

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Structural Materials Division (SMD) Undergraduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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SPU-18: Diffusion within the 14-Frequency Model in Silver. Kristin Mackowski1; 1New Mexico Institute of Mining & Technology

SPU-19: Fabrication of Aluminum Welding Fillers Reinforced with Niobium Diboride Nanoparticles for Aerospace Applications. Amir Gomez Perez1; Norman Burgos1; Andres Calle1; Oscar Marcelo Suarez2; 1University of Puerto Rico Mayaguez

SPU-20: Identifying Damage Initiation of Woven Fiberglass Composites Under Compression. Isabella Mendoza1; Ariana Paradiso1; Leslie Lamberson1; 2Drexel University

SPU-21: Microstructure and Mechanical Properties of Al0.5CoFeNi High Entropy Alloy. Jadzia Graves1; Anumat Sittiho1; Indrajit Chari1; Rajiv Mishra1; 1University of Idaho; 2University of North Texas

SPU-22: Study of Dopants in U-Zr Metallic Fuels for Limiting Fuel-Cladding-Chemical-Interaction. Nicholas Ayers1; Rabi Khanal1; Nathan Jerred1; Indrajit Chari1; Michael Benson2; Robert Mariani2; Samrat Choudhury1; 1University of Idaho; 2Idaho National Laboratory
**SPECIAL TOPICS**

2019 Technical Division Young Professional Poster Contest — Extraction and Processing Division (EPD)

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-1: Study on the Properties and Mineralization Process of a Cu-Ni Bearing Industry Sludge: *Mudan Liu; Yong Liu*; Zhiqiang Chen; Zhiyuan Ma; ‘Guangdong Institute of Resource Comprehensive Utilization

**SPECIAL TOPICS**

2019 Technical Division Young Professional Poster Contest — Light Metals Division (LMD)

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-3: Analysis and Interpretation about Evaluation and Atomic Vibration of New Raman Active Modes from CDW Phase in of Layered 2H-TaX2 (X=S, Se): *Sugata Chowdhury; Kamilla Arnesen*; ‘National Institute of Standards and Technology

YP-4: PAH Emissions from the Metallurgical Industry: *Kamilla Arnesen*; ‘Norwegian University of Science & Technology

**SPECIAL TOPICS**

2019 Technical Division Young Professional Poster Contest — Materials Processing and Manufacturing Division (MPMD)

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-5: Fatigue Characterization and Microstructure-sensitive Modeling of Extruded and Friction Stir Welded Aluminum Lithium Alloy 2009: *Abby Cisko; Brian Jordan*; ‘US Army Engineer Research and Development Center; ‘University of Alabama

**SPECIAL TOPICS**

2019 Technical Division Young Professional Poster Contest — Structural Materials Division (SMD)

**Sponsored by:** TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-7: Flaw Tolerance of Shape Memory Yttria-stabilized Tetragonal Zirconia Polycrystals: *Ning Zhang; Mohsen Asle Zaeemi; ‘Colorado School of Mines

YP-8: The Guiding Principles of the Dopants Selection to Immobilize Lanthanide Fission Products in Uranium-based Metallic Fuels: *Rabi Khanal; Nathan Jerred; Michael Benson; Robert Mariani; Indrajit Chaiti; Samrat Choudhury; ‘University of Idaho; ‘Idaho National Laboratory

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Poster Session

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clare, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

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A-1: A Comparison Study of Microstructures and Mechanical Properties of Additively Manufactured Titanium Alloys: *Thomas Voisin; Jean-Baptiste Forien; Yinmin Wang; ‘Lawrence Livermore National Laboratory

A-3: Additive Manufacturing of 17-4PH Stainless Steel on Ti-6Al-4V Using Pure Vanadium Interlayer: *Nana Adomako; Jeoung Thomas Kim; Sanghoon Noh; ‘Hanbat National University; ‘Korea Atomic Energy Research Institute

A-5: Comparison of Ex Situ X-ray Tomography and In Situ Monitoring to Gain Control over Defects during Laser Powder Bed Fusion: *Suresh Sudharsan; Philip Depond; Gabe Guss; Bradley Jared; Jonathan Madison; Elena Garlea; Hahn Choo; ‘University of Tennessee

A-6: Effect of Cryo-rolling on Microstructure and Tribological Behaviour of Spray Formed Al-Si Alloy: *Surendra Chourasiya; Gaurav Gautam; Devendra Singh; ‘Indian Institute of Technology, Roorkee
**POSTERS**

**TECHNICAL PROGRAM**

**A-8:** Effects of Beam Oscillation on Porosity & Intermetallic Compounds Formation of Electron Beam Welded DP600 Steel to Al-5754 Alloy Joints: *Soumitra Dinda*1; Prakash Sirirangam2; Gour Gopal Roy3; 1Indian Institute of Technology Kharagpur; 2Warwick Manufacturing Group

**A-9:** Effects of La203 Addition on the Brazing Dissimilar Joints of WC-Co/1Cr13: A Combined Experimental and Computational Thermodynamics Study: Vaohong Xiao1; Yi Wang2; Keqin Feng3; Lei Chen4; 1Mississippi State University; 2The Pennsylvania State University; 3Sichuan University

**A-10:** Effects of Ultrasonic Micro-forging on 304 Stainless Steel Fabricated by WAAM: Laibo Sun5; 1Harbin Engineering University

**A-11:** Evolution of Weld Interface during Rotary Friction Welding between Stainless Steel and Medium Carbon Steel: *Murali Mohan Cheepu*6; Woo-Seong Che7; 6Department of Mechatronics Engineering, Kyungsung University; 7Department of Mechatronics and Materials Engineering, National Institute of Technology Tiruchirappalli; 2Kyungsung University

**A-12:** Experimental Investigation of High Strength Steels Welded Using High Yield Electrodes for Commercial Vehicle Application: Ramya Gopalakrishnan1; Dhanasekaran Sh1; Srinivasan S2; 1Ashok leyland

**A-13:** Interface Microstructural Characterization of Titanium to Stainless Steel Dissimilar Friction Welds: *Murali Mohan Cheepu*6; V Muthupandi6; Woo-Seong Che7; 6Department of Mechatronics Engineering, Kyungsung University; 7Department of Mechatronics and Materials Engineering, National Institute of Technology Tiruchirappalli; 2Kyungsung University

**A-14:** Mechanical Property Characterization of Single Scan Laser Tracks of Nickel Super Alloy 625 by Nanoindentation: Jordan Weaver1; Meir Kreitman1; Jarred Heigel1; M. Donmez1; 1National Institute of Standards and Technology

**A-15:** Metallurgical Characteristics of Laser Peened 17-4 PH SS Processed by LENS Technique: *Iphi Mathoho*1; Esther Akinlubi1; Nana Arthur1; Tiotleng Monamme1; Bathusile Masina1; 1University of Johannesburg; 2CSIR

**A-16:** Microstructural Refinement Using Tailored Beam Shapes during Laser Additive Manufacturing: Tien Roehling1; John Roehling1; Saad Khairallah1; Gabe Guss1; Rongpei Shi1; Joseph McKeown1; Manyalibo Matthews1; 1Lawrence Livermore National Laboratory

**A-17:** Microstructural Study of Soft Metals Produced by Liquid Metal Jetting: Yaakov Ideel1; Jason Jeffries1; Andrew Pascall1; Kerri Blobaum1; 1Lawrence Livermore National Laboratory

**A-18:** On the Role of Bimodal Powder Size Distribution on Mechanical Properties and Microstructure of Laser Melted 316L Stainless Steel: *Hannah Coe*1; Somayeh Pasebani1; 1Oregon State University

**A-19:** Superior-ductility Direct Laser Melted 316L Stainless Steel from New and Recycled Powders and Different Laser Spot Sizes: Kun Yang1; Geoff Delooze1; Robert Wilson1; 1Metal Industries, CSIRO Manufacturing

**A-20:** The Development of Cementless Orthopedic Implants by 3D Printing: *Taeyang Kwak*2; Myungjae Lee2; Yeonbeom Heo2; Hoonyoung Ban3; Hansol Seo3; Dohyung Lim1; 1Department of Mechanical Engineering, Sejong University; 2Intec Corporation co. Ltd.; 3Samsung Medical Center

**A-21:** The Effect of Extrusion Process on the Mechanical Properties of AM AISI10Mg: Adi Ben-Artzi1; Arie Bussibaa1; Gal Hadad1; 1Ben Gurion University; 2N.R.C.N

**A-22:** Two-Dimensional Additive Manufacturing for Energy Applications — Student Poster Session

**Sponsored by:** TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Chariit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

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**Session Chair:** Indrajit Charit, University of Idaho

**A-24:** Additively-manufactured Nanostructured Copper: *Jeffrey Graham*1; Kumar Sridharan2; Benjamin Maier3; Hwsung Yeom4; Peter Hosemann5; David Hoelzer6; Stuart Maloy7; 1Department of Nuclear Engineering, University of California Berkeley; 2University of Wisconsin, Madison; 3Oak Ridge National Laboratory; 4Los Alamos National Laboratory

**A-25:** Fabrication of Cr Cladded Zr-1-alloys Using Solid State Powder Spray Additive Manufacturing Technology: *Benjamin Maier*3; Hwsung Yeom4; Greg Johnson4; Tyler Dabney4; Kumar Sridharan3; 1University of Wisconsin-Madison

**A-26:** Investigation of Manufacturing Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes Using Cold Spray Technology: Mia Lenting1; Hwsung Yeom4; Benjamin Maier3; Greg Johnson4; Kumar Sridharan3; Peter Hosemann5; David Hoelzer6; Stuart Maloy7; 1University of Wisconsin-Madison; 2University of California-Berkeley; 3Oak Ridge National Laboratory; 4Los Alamos National Laboratory

**A-27:** Investigation of Process Parameter Optimization for 316L: *Luis Nunez*1; Federico Sciammarella2; Porfirio Navar3; David Williams3; Mark Sliwka3; Thomas Corbett3; Daniel Pulsher3; 1Northern Illinois University

**A-28:** Prototyping of a Laboratory-scale Cyclone Separator for Biofuel Production from Biomass Feedstocks Using a Fused Deposition Modeling Printer: Sam Hansen1; 1University of Idaho

**ADDITIVE TECHNOLOGIES**

Additive Manufacturing for Energy Applications — Student Poster Session

**A-23:** Transient Dynamics of Powder Spattering in Laser Powder Bed Fusion Additive Manufacturing Process Revealed by In-situ High-speed High-energy X-ray Imaging: *Qilin Guo*2; Cang Zhao2; Luis Escano3; Zachary Young4; Lianghua Xiong5; Kamel Fezzaa3; Wes Everhart2; Ben Brown2; Tao Sun2; Liangyi Chen2; 1Missouri University of Science and Technology; 2Argonne National Laboratory; 3Honeywell FM&T

**A-24:** Additively-manufactured Nanostructured Copper: *Jeffrey Graham*1; Kumar Sridharan2; Benjamin Maier3; Hwsung Yeom4; Peter Hosemann5; David Hoelzer6; Stuart Maloy7; 1Department of Nuclear Engineering, University of California Berkeley; 2University of Wisconsin, Madison; 3Oak Ridge National Laboratory; 4Los Alamos National Laboratory

**A-25:** Fabrication of Cr Cladded Zr-1-alloys Using Solid State Powder Spray Additive Manufacturing Technology: *Benjamin Maier*3; Hwsung Yeom4; Greg Johnson4; Tyler Dabney4; Kumar Sridharan3; 1University of Wisconsin-Madison

**A-26:** Investigation of Manufacturing Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes Using Cold Spray Technology: *Mia Lenting*1; Hwsung Yeom4; Benjamin Maier3; Greg Johnson4; Kumar Sridharan3; Peter Hosemann5; David Hoelzer6; Stuart Maloy7; 1University of Wisconsin-Madison; 2University of California-Berkeley; 3Oak Ridge National Laboratory; 4Los Alamos National Laboratory

**A-27:** Investigation of Process Parameter Optimization for 316L: *Luis Nunez*1; Federico Sciammarella2; Porfirio Navar3; David Williams3; Mark Sliwka3; Thomas Corbett3; Daniel Pulsher3; 1Northern Illinois University

**A-28:** Prototyping of a Laboratory-scale Cyclone Separator for Biofuel Production from Biomass Feedstocks Using a Fused Deposition Modeling Printer: Sam Hansen1; 1University of Idaho
**ADDITIONAL TECHNOLOGIES**

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Poster Session

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohten Asle Zaeem, Colorado School of Mines; Sudarsanan Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

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A-29: Additive Manufactured 316L Stainless Steel for Biomedical Applications: Wassem Haider1; Jahangir Khan Lodhi2; 1Central Michigan University

A-30: In Situ Low Cost Stereovision Analysis of Spatter: Christopher Barrett1; Carolyn Carradero1; Evan Harris1; Eric MacDonald1; Brett Conner1; 1Youngstown State University

A-32: Powder Packing Density and its Impact on SLM-based Additive Manufacturing: Taher Abu-Lebedeh1; Ransford Dampney1; Vincent Lambert1; Sameer Hamoush1; 1North Carolina A&T State University; 2Y-12 National Security Complex

A-33: Quantifying Laser-matter Interactions and Their Impact on Defect Formation during Additive Manufacturing of Ti-6Al-4V Using In Situ Synchrotron X-ray Imaging: Lorna Sinclair1; Yunhui Chen1; Chu Lun Alex Leung1; Samuel Clark1; Sebastian Marussi2; Sam Tammas-Williams1; Leigh Stanger1; Robert Atwood1; Margie Olinbado1; Alexander Rack1; Jon Willmott1; Iain Todd1; Peter Lee1; 1University College London; 2University of Manchester; 3University of Sheffield; 4Diamond Light Source Ltd.; 5European Synchrotron Radiation Facility

A-34: Texture Mapping in Electron Beam Welded Dissimilar Cu-SS Joints by Neutron Diffraction: Soumitra Dinda1; Jyotirmaya Kar1; Prakash Siriringam1; Winfried Kockelmann1; Gour Gopal Roy1; 1Indian Institute of Technology Kharagpur; 2University of Warwick; 3ISIS Facility

**POSTERS**

**ADDITIONAL TECHNOLOGIES**

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Poster Session

**Sponsored by:** TMS: Phase Transformations Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohten Asle Zaeem, Colorado School of Mines; Sudarsanan Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, Quetek Innovations LLC

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A-36: Effect of Different Aqueous Electrolytes on Corrosion Resistance of Selective Laser Melted Ti-6Al-4V Alloy: Ashutosh Sharma1; Minseok Oh2; A.K. Srivastava3; Yu Hwan Kim4; Byungmin Ahn5; 1Aju University; 2OP Jindal University, Raigarh, C.G., India; 3Z3DFAB Corp

A-37: Effect of Shielding Gas Flow Rate on Inclusion Evolution and Mechanical Property: Du-Rim Eo1; Jung-Wook Cho1; Sun-Hong Park2; 1Pohang University of Science and Technology (POSTECH); 2Research Institute of Industrial Science and Technology (RIST)

A-38: Finite Element Simulation of Temperature Distribution in a Selective Laser Melting Process: Luis Arturo Reyes Osorio1; Roberto Cabriales2; Omar Lopez-Boitello2; Patricia Zambrano Robledo2; 1Universidad Autonoma De Nuevo Leon; 2Instituto Tecnologico y de Estudios Superiores de Monterrey

A-39: Form Mechanism of Electron-beam Additive Manufacturing of Shaped Titanium Alloy with Thin-walled and Complex Structure: Shifeng Liu1; Xin Yang2; Yaojia Ren3; 1Xi’An University of Architecture and Technology

A-40: Improvement of the Mechanical Properties of Inconel718 Fabricated by Selective Laser Melting (SLM): Seren Ozerc1; Guneys Bilgin1; Ziya Esen1; Arcan Dericioglu1; 1Middle East Technical University; 2Cankaya University

A-41: Microstructural Evolution Modeling for Selective Laser Sintering: Yulan Li1; Erin Barker1; 1Pacific Northwest National Laboratory

A-42: Ni-TiB2 Composite for Additive Technology of Direct Metal Deposition: Vladimir Promakhov1; Mansur Ziadov1; Aleksandr Zhukov1; Olga Korsmik1; 1Tomsk State University; 2Saint Petersburg State Marine Technical University

A-44: Twin Formation and Deformation Induced Phase Transformation in 304L Stainless Steel Fabricated by Selective Laser Melting: Zhiuang Zhu1; Gui-bau Nguyen1; Mui-ling Nai1; Jun Wei1; 1Singapore Institute of Manufacturing Technology
ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Poster Session

**Sponsored by:** TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

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A-45: Additive Manufacturing of Commercial Metastable β-Ti alloys: Srinivas Aditya Mantri1, Eugene Ivanov2, Rajarshi Banerjee2, 1University of North Texas; 2Tosoh SMD Inc.

A-46: Bone Growth Investigation around Additive Manufacturing Metal-ceramics Composite: Wei Chang1, Chun-Chieh Wang2, Shao-Ju Shih3, Nien-Ti Tsou2, Kuan-Ying Tseng3; Pei-Yi Tsai1, Wei-Qin Huang1, Jo-Chi Tseng1, Hung-Sheng Chou1, E-Wen Huang1, 1Department of Materials Science and Engineering, National Chiao Tung University; 2National Synchrotron Radiation Research Center; 3Department of Materials Science and Engineering, National Taiwan University of Science and Technology; 4Laser and Additive Manufacturing Technology Research Center (LAMC) Industrial Technology Research Institute (ITRI); 4Deutsches Elektronen-Synchrotron (DESY), Germany


A-48: Gas-phase Alloying and Sintering Printed Nickel Scaffolds: Safa Khodabakhsh1, Ashley Paz y Puente1, 1University of Cincinnati

A-49: Integrated Computational and Experimental Study of an Additively Manufactured Hot-work Tool Steel: Chao-Ying Chou1, Greta Lindwall1, Joakim Odqvist1, Annika Borgenstam1, 1KTH Royal Institute of Technology

A-50: Machine Learning Method for Parameter Development: Voramon Dheeradhada1, Natarajan Chennimalai Kumar2, Laura Dial1, Vipul Gupta1, Tim Hanton1, Joe Vinciquerra1, 1Ge Global Research

A-51: Mechanical Behavior and Microstructure of Porous Ti Using TiC as Reinforcement: Shiyuan Liu1, Jian Wang1, Tengfei Lu1, Guibao Qiu1, Hao Cui1, 1Chongqing University

A-52: Mechanical Testing of Additively Manufactured IN625 Thin-walled Elements: Arumina Banerjee1, Matthew Vaughn1, Jamie Guest1, Kevin Hemker1, Michael Groebner1, Jonathan Miller2, William Musinski1, Edwin Schwabbach1, Paul Shade2, 1Johns Hopkins University; 2Air Force Research Laboratory


A-54: Process Optimization and Performance of Different Lattice Structures of 316L Stainless Steel by Selective Laser Melting (SLM): Xiaojing Sun1, 1Harbin Engineering University

A-55: Processing of Haynes® 282® Alloy by Laser Powder Bed Fusion Technology: Robert Otto1, Vegard Broten1, Amin S. Azar1, Olav Aasebø1, 1SINTEF

A-56: Reduction of Micro-Cracking in Inconel 718 Processed by Selective Laser Melting: Viridiana Lince Quintanilla1, Rigoberto Guzman1, Omar Lopez2, Patricia Zambrano1, 1University Autonoma de Nuevo Leon; 2Instituto Tecnologico de Estudios Superiores de Monterrey

A-57: Role of Particle Size Distribution, Layer-thickness and Process Parameters on the Performance of Materials Processed by Direct Metal Laser Melting (DMLM): Vipul Gupta1, Kate Gurnon1, Laura Dial1, Rajendra Kelkar2, 1GE Global Research; 2GE Additive


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MATERIALS PROCESSING

Advances in Surface Engineering — Poster Session

**Sponsored by:** TMS: Surface Engineering Committee

**Program Organizers:** Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarak, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

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E-1: Corrosion and Wear Resistance of PTFE-Al2O3 Coatings Deposited on Aluminum Alloy by a Microblanding Process: Atinuke Oladoye1, James Carton2, Ahmad Baroutaji3, Muhammad Obeidi4, Joseph Stokes2, Barry Twomey2, Abdul Olabi3, 1Metallurgical & Materials Engineering, University of Lagos, Akoka, Nigeria; 2Dublin City University

E-2: Microstructure and Wear Properties of Cold Sprayed Nanodiamond Aluminum Composite Coating: Archana Loganathan1, Sara Rengifo1, Alexander Hernandez1, Yusuf Emirov1, Cheng Zhang1, Benjamin Boesl1, Jeganathan Karthikeyan1, Arvind Agarwal1, 1Florida International University; 2ASB Industries

E-4: Surface Enhancement of Mild Steel with ZrO2 Composite Induced Zinc Based Electrolyte by Electrodeposition Technique: Ojo Sunday Fayomi1, 1Covenant University

E-5: The Wear Behavior of Thermally Sprayed Al-TiC Composite Coatings on the Carbon Steel Substrate: Rasoul Jamshidi1, Omid Bayat1, Akbar Heidarpour1, Hamed Aghamohammadi1, 1Hamedan University of Technology

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LIGHT METALS

Alumina & Bauxite — Poster Session

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizer:** Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

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**Session Chair:** Sebastien Fortin, Rio Tinto Aluminium Technology Solutions - ARDC

D-1: Application of Ozonation for the Degradation of Organic Compounds of Bayer Liquor: Miguel Sotolin1, Denise Espinosa1, Marcela Baltazar1, 1Universidade de Sao Paulo
D-2: Assessment of the Surface Hydrophilicity and Characterization of Alumina Oxidized at Different Temperatures: Naouel Hezil1; Mamoun Fellah1; 1Abbes Laghrourh Khenchela University; 2Tribology & Materials Group, Laboratory of Foundry, Annaba University

D-3: Intensified Desilication-Bayer Process Extract Alumina from High Alumina Fly Ash: Gong Yanbing1; Sun Junmin1; Zhang Tingan1; Lu Guozhi2; 1Northeastern University

D-49: Improvement of the Mechanical Properties of the Aluminum Alloy 7075 by ARB: Omar Velazquez Carrillo1; Francisco Garcia Pastor1; 2CINVESTAV

D-50: Investigation of the Microstructure and Mechanical Properties of Cast AA7068 Hybrid Nanocomposite Reinforced with GNPs and SiC: Mohammad Alipour1; 1University of Tabriz

D-51: Microstructure Characterization and Properties of Cast Al-Si-Fe-Zn Alloys with High Thermal Conductivity: Chun Zou1; Gu Zhong1; Chu Qi1; Xinghui Gui1; 1Chinalco Materials Application Research Institute Co., Ltd. Suzhou Branch

D-52: Modification of A7075 Alloy for Improved Extrudability: Se-Hoon Kim1; Jae-Hyuck Shin1; Min-Sang Kim1; Jin-Pyeong Kim1; Si-Young Sung1; Beom-Suck Han1; 1Korea Automotive Technology Institute

D-53: Relationship between Si Content and Activation Energy of Si Precipitation in Al-Si Alloys: Yu-Mi Kim1; Se-Weon Choi1; Young-Chan Kim1; Chang-seog Kang1; 1KITECH

D-54: Strengthening Behaviour of Al-Si Alloy Containing Oxygen Atoms: Jeheon Jeon1; Donghyun Bae1; 1Yonsei University

D-55: Study on Microstructure and Mechanical Properties of Al-Zn-Cu Based Alloys with Additive Elements using Extrusion: Yong-Ho Kim1; Hyeo-Sang Yoo1; Hyeon-Tae Son1; 1Korea Institute of Industrial Technology

D-56: The Effect of Ag on the Microstructures and Properties of Al-Mg Alloys: Haitao Zhang1; Bo Zhang1; 1Northeastern University; 2China Hongqiao Group Limited

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Poster Session I - Development of Aluminum Alloy Processing

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Hiromi Nagaumi, Soochow University

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D-39: Development of High Thermal Conductivity Aluminum Alloys for the Integrated Plastic / Metal Molding (IMKS): Hyun Kyu Lim1; Wonseok Yang1; Young Ok Yoon1; Shae K. Kim1; 1Korea Institute of Industrial Technology

D-40: Effect of Alloying Elements on the Thermal Conductivity and Other Properties of Aluminum Alloys Developed as Casting Alloys: Wonseok Yang1; Bonghwon Kim1; Shae K. Kim1; Hyun Kyu Lim1; Do Hyang Kim1; 1Korea Institute of Industrial Technology; 2Yonsei University

D-41: Effect of Cu Addition on the Microstructure, Mechanical and Thermal Properties of an Al-Si Piston Alloy: Suwaree Chanhimtumnong1; Dmitry Eskin1; Chaowalit Limmaneevichitr1; 1King Mongkut's University of Technology Thonburi; 2Brunel University London

D-42: Effect of Mn on Microstructure and Isochronal Aging of Al-Ni-Sc Alloys: Phromphong Pandees1; Chanun Suwanpreecha1; Chaowalit Limmaneevichitr1; 1King Mongkut's University of Technology Thonburi

D-43: Effect of Rare Earth Metals on Microstructure and Mechanical Properties of Aluminum alloys Processed by Extrusion: Hye-Sang Yoo1; Yong-Ho Kim1; Hyeon-Taek Son1; 1Korea Institute of Industrial Technology

D-44: Effects of Alloying Elements on Mechanical and Thermal Characteristics in Al-Si-Mg-(Cu) Foundry Alloys for Automotive Engine Components: Seweon Choi1; Yumi Kim1; Youngchan Kim1; Changseog Kang1; 1KITECH

D-45: Effects of Sc and Zr Addition on Microstructure and Mechanical Properties of Al-3Cu-2Li Alloy: Yang Wang1; 1Harbin Engineering University

D-46: Effects of the Strontium on Microstructure Mechanical Properties of Sand Casting A356 Alloy during Solution Treatment: Myounggyun Kim1; 1Research Institute of Industrial Science

D-47: Effects on Microstructure Evolution of Al-9Si-0.3Mg Alloy by Pyrometallurgically Produced Sr Master Alloy: Ibrahim Gokset Hitiz1; Derya Dispinar1; 1Istanbul University

D-48: High Strength and Corrosion Resistant Al Alloys at High Temperature: Irena Paulin1; Borut Žužek1; Peter Cvahter1; Matjaž Godec1; 1IMT; 1IMPOL

D-49: Effect of Multi-pass Friction Stir Welding on the Microstructure, Mechanical and Wear Properties of AA6061/CNTs Nanocomposites: Mohammad Alipour1; Ali Ghasemi1; Ali Shakiba1; 1University of Tabriz; 2Islamic Azad University Tehran North Branch; 3University of Tehran

D-50: Evaluation of β-phase Formation in 5xxx Aluminum Alloys: William Golumbfskie1; Emily Holcombe1; Kyle Matthews1; Daniel Foley1; Mitra Taheri1; 1Naval Surface Warfare Center, Carderock Division; 2Drexel University

D-51: Examination of Formability Properties of 6xxx Alloy Extruded Profiles for the Automotive Industry: Athanasios Vazdirvanidis1; Sofia Papadopoulou1; George Pantazopoulos1; Andreas Rikos1; Gregory Simeonidis1; 1ELKEME S.A.; 2ETEM S.A.

D-52: Improvements for The Recognition Rate of Surface Defects of Aluminum Strips: Xiaoming Liu1; Ke Xu1; Dongdong Zhou1; 1University of Science and Technology Beijing

D-53: Influence of CNTs Nanoparticles Incorporation to Friction Stir Welded 6061Aluminum Alloy on the Microstructure and Shear Punch Properties: Mohammad Alipour1; Ali Ghasemi1; Ali Shakiba2; 1University of Tabriz; 2Islamic Azad University Tehran North Branch; 3University of Tehran

D-54: Study on Microstructure and Mechanical Properties of Al-Zn-Cu Based Alloys with Additive Elements using Extrusion: Yong-Ho Kim1; Hyeo-Sang Yoo1; Hyeon-Taek Son1; 1Korea Institute of Industrial Technology
D-63: Investigation of Mechanical Properties for 7075 Aluminum Alloy using Friction Stir Welding (FSW) Reinforced with CNTs: Mohammad Alipour1; Ali Ghasemi2; Ali Shakiba1; 1University of Tabriz; 2Islamic Azad University Tehran North Branch; 3University of Tehran

D-64: Mechanical Characterization of Cold Sprayed Aluminum Alloy Powders Using In Situ Micropillar Compression and Tension: Tyler Flanagan1; Benjamin Bedard1; Mark Aindow1; Avinash Dongare1; Harold Brody1; Aaron Nardi1; Victor Champagne2; Seok-Woo Lee1; 1University of Connecticut; 2Army Research Laboratory

D-65: Microstructure and Surface Finish Evolution During Incremental Sheet Forming of AA 7075: Maya Nath1; Ankush Bansal1; Jaekwang Shin1; Randy Cheng1; Mihaela Banu2; Alan Taub2; 1University of Michigan

D-66: Microstructures and Mechanical Properties of Low Si Content Al-Si-Mg Alloy: Jia Lina1; Zhang Hu1; Zhou Li1; 1Beihang University

D-67: Primary Si Refinement in Hyper-eutectic Al-Si Alloys Using Metal-oxide Particles: Jaehyuck Shin1; Sehoon Kim1; Jinyeong Kim1; Gyeongseok Jo1; Siyoung Sung1; Beomsuck Han1; 1Korea Automotive Technology Institute

D-68: Production of Commercially Pure Aluminum Electrical Conductor Strips via a Single-step, Machining-based Technique: Mohammed Issahaq1; Xiaolong Bai1; Srinivasan Chandrasekar1; Kevin Trumble1; 1Purdue University

D-69: The Effects of T6 Treatment and Extrusion Process on the Microstructure and Wear Behavior of Al7068 Aluminum Matrix Hybrid Nanocomposites Reinforced with GNPs and SiC Nanoparticles: Mohammad Alipour1; 1University of Tabriz

D-70: The Preparation Methods and Application of Aluminum Foam: Xia Duan1; Zhwei Dai1; Rong Xu1; Ronghui Mao1; Binna Song1; 1Soochow University

D-71: The Role of In Situ Stacking Faults in the Deformation Mechanism of I-Al: Miran Joo1; Jeheon Jeon1; Donghyun Bae1; 1Yonsei University

D-72: Through-thickness Strain Gradient in a Hot Rolled Al-Mg Alloy Obtained by Nanoindentation and Glancing Angle X-ray Diffraction: Sepideh Parvinian1; Eric Hoar1; Mehdi Shafiei1; John Hunter1; Hamid Garmestani1; 1Georgia Institute of Technology; 2Novelis Global Research and Technology Center

LIGHT METALS

Aluminum Reduction Technology — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Marc Dupuis, GeniSim Inc

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Hall 3 | Henry B. Gonzalez Convention Center

D-4: Study on the Preparation of Lithium Carbonate from Lithium-rich Electrolyte: Wei Wang1; Weijie Chen1; Yuzhi Li1; Keijing Wang2; 1Henan University of Science and Technology

D-6: The Application of the “Remote Data-diagnosis Technology Service” (RDTDS) for Aluminum Pot Line: Hong Bo1; Tian Qinghong1; Yi Xiaobing1; Xie Zhiru1; 1Chalieco Gami

D-7: Study on Stress Distribution and Configuration Optimization of Lining Structure for Aluminum Reduction Cell: Jing Liu1; Yungang Ban1; Yu Mao1; Qingchen Yang1; Jihong Mao2; Hui Dong3; Fei Dong3; 1Northeastern University Engineering & Research Institute Co Ltd

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Poster Session

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

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B-15: The Optimization of the Process Parameters of Direct Energy Deposition (DED) 3D Printing in the Manufacture of CoCr-Ti Interface with Ti Porous Layer for Cementless Implants: HunYeon Bari1; Taeyang Kwak1; JoonHo Wang1; ChungHee Sonn1; EuiYub Jung1; HanSoo Seo1; DoHyung Lim1; 1Sejong University; 2Samsung Medical Center

BIOMATERIALS

Biological Materials Science — Poster Session

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Rajendra Kasinath, DePuy Synthes Johnson and Johnson; Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

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Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Jing Du, Penn State University; David Restrepo, The University of Texas at San Antonio

B-1: 3D Printing Bioinspired Composite Materials with Ultrasound Directed Self-assembly: Paul Wadsworth1; Isaac Nelson1; Taylor Ogden1; Steven Naleway1; 1University of Utah

B-2: A Biodegradable Fe-based Material Alloyed with S, P and Ag with Surface Modification by Laser Ablation: Matjaz Godec1; Aleksandra Kocian1; Irena Paulin1; Crtomir Donik1; Jaka Burja1; Peter Gregorcic1; 1Institute of Metals And Technology; 2University of Ljubljana

B-3: Calcium Phosphate Microspheres: A Novel Approach to Calcium Phosphate Cements: Jerry Howard1; Isaac Nelson1; John Colombo1; Steven Naleway1; Krista Carlson1; 1University of Utah

B-4: Controlled Antibiotic-loaded, Drug-eluting Implants for Osteomyelitis: Daniel Li1; Elan Volchenko1; Rachel Bergman1; Matt Siegel1; Pravin Vence1; Fei Yang1; Decheng Wu2; 1Northwestern University; 2University of Michigan; 3Chinese Academy of Sciences
**B-5:** Copper Recovery from Printed Circuit Boards from Smartphones through Bioleaching: Lidiane Andrade; Carlos Rosario; Mariana Carvalho; Denise Espinosa; Jorge Tenório; LAREX

**B-6:** Dependence of the Ferrovanadium Power as Additive on Mechanical Property in Porous Ti: Guibao Qi; Jian Wang; Shiyuan Liu; Yilong Liao; Chenguang Bai; Chongqing University

**B-7:** Effect of Compaction Pressure on Porosity and Mechanical Properties of Porous Titanium as Bone Substitute Materials: Guibao Qi; Qingjuan Li; Shiyuan Liu; Tengfei Lu; Chongqing University

**B-8:** Effect of Sintering Temperature on Tribological Behaviour of Ti-Ni Alloy for Biomedical Applications: Felliah Mamoun; Hezil Naouel; Mohammed Abdul Samad; Mechanical Engineering Department, ABBBES Laghour- Khencelia University; Materials sciences department, ABBBES Laghour - Khencelia University; KFUPM University

**B-9:** Impact of Ligand Composition on Protein Corona Formation around Au Nanoparticles: Sam Hoff; Desiré Di Silvio; Sergio Moya; Ronald Zlot; Hendrik Heinz; University of Colorado Boulder; CIC biomatGUNE: Centro de Investigación en Química Aplicada

**B-10:** Nanoscale Porous Bioinspired Materials through Ice and Ultrasound Templating: Max Mroz; Taylor Ogden; Isaac Nelson; Milo Prisbrey; Bart Raeymaekers; Steven Naylor; University of Utah

**B-11:** Structural Basis for the Damage Tolerance of the Low-density Cellular Structure of Cuttlebone: Ting Yang; Ling Li; Virginia Tech

**B-13:** The Development of Nanoclay-hydroxyapatite Composite Scaffolds for Bone Tissue Engineering: Solathah Miar; Sergio Montelongo; Aklilehs Gaharwar; Teja Guda; University of Texas at San Antonio; Texas A&M University

**B-14:** The Effect of Milling Time on Structural, Friction, and Wear Behavior of Hot Isostatically Pressed Ti-Ni Alloys for Orthopedic Applications: Felliah Mamoun; Hezil Naouel; Mohammed Abdul Samad; Tuhami Mohamed Zneina; Alex Montagne; Alain Iost; Alberto Mejias; Stephania Kosman; Mechanical Engineering Department, ABBBES Laghour- Khencelia University; Materials Sciences Department, ABBBES Laghour - Khencelia University; KFUPM University; Annaba University; MSMF, ENSAM Lille

**NUCLEAR MATERIALS**

Ceramic Materials for Nuclear Energy Research and Applications — Poster Session

**Sponsored by:** TMS: Nuclear Materials Committee

**Program Organizers:** Yongfeng Zhang, Idaho National Laboratory; Xian-ming Dai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission-JRC-Institute of Transuranium Elements

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**G-1:** A Three-degree-of-freedom Representation of the Five-degree-of-freedom Grain Boundary Energy Space for Uranium Dioxide: Emily Taggare; Evan Hansen; Yongfeng Zhang; Sean Masengale; Chandler Williams; Axel Seoane; BYU: Idaho National Laboratory

**G-2:** Irradiation Effects on Reactor Concrete Structures: José Arregui-Mena; Alan Gioria; G Jellison; Elena Tajuelo-Rodriguez; Christa Torrence; Masaki Kawai; Yann Le Pape; Thomas Rosseel; Oak Ridge National Laboratory; Texas A&M University; Mitsubishi Research Institute

**G-3:** Summary of In-situ Tritium Measurements from TMIST-3A: Walter Luscher; David Senor; Gary Hoggard; Kevin Clayton; Pacific Northwest National Laboratory; Idaho National Laboratory

**G-4:** Thermochemical Investigation of (Fe,Cr,Al)O Spinel: Can Agca; Jake McMurray; Joerg Neuheinfeld; Alexandra Navrotsky; Peter A. Rock Thermochemistry Laboratory; Oak Ridge National Laboratory

**G-5:** Void Dynamics in Porous Thin Films under Ion Irradiation: Anter El-Azab; Purdue University

**CORROSION**

Coatings and Surface Engineering for Environmental Protection — Poster Session

**Sponsored by:** TMS: Surface Engineering Committee

**Program Organizers:** Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

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**Session Chairs:** Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research

**C-2:** A Study of Cl Adsorption on Hydroxylated Cr2O3 Passive Film Using Density Functional Theory (DFT): Kofi Oware Sarfo; Pratik Vinod Murkute; Burkan O. Isgor; Yongfeng Zhang; Julie D. Tucker; Liney Arnadottir; Oregon State University; Idaho National Laboratory

**C-3:** Ceramic Materials as Corrosion Protective Agents for Urethane Films on Steel ABNT 1020 Epoxyated: Goncalo Siqueira; Fabio Esper; Rocio Hernandez; Leonardo Silva; Jose Mauro Oliveira; Wanderley Costa; Helio Wiebeck; USP

**C-4:** Corrosion Behavior of Aluminum Alloy AA7075 Cold Sprayed Coatings: Ozymandias Agar; Anne Alex; Luke Brewer; University of Alabama

**C-5:** Localized Corrosion Behaviour of AA7150 after Ultrasonic Shot Peening: Corrosion Depth and Impact Energy: Qingyou Han; 1IMR CAS; Purdue University

**C-6:** Mechanisms of Oxidation of Pure and Si-segregated Cr2O3 Thin Films: Somesh Bhattacharya; Ryoji Sahara; Kyoosuke Ueda; Takayuki Narushima; National Institute For Materials Science; Tohoku University

**C-7:** Mechanistic Understanding of Corrosion-Inhibition in Graphene/Polyethymide Nanocomposites: From Tortuosity to Galvanic Corrosion: Rachel Davidson; Sarbajit Banerjee; Texas A&M University

**C-8:** Salt Test Methods and Controls as a Study of Corrosion in Polluted Areas: Goncalo Siqueira; Emilio da Silva; Gabriel Santos; Allan Muniz Souza; Helio Wiebeck; USP

**C-9:** Study of Mechanisms of Cobalt Electrodeposition by Means of Potentiodynamic Polarization Curves: Marti Ohba; Tatiana Scarazzato; Denise Espinosa; Jorge Alberto Tenorio; Zehbour Panosian; Institute for Technological Research; University of Sao Paulo
C-10: The Effects of Addition of TiO2 Nanoparticles on the Corrosion and Tribological Performance of the Thermally Spared Aluminum Coatings: Nooshin Salimi1; Omid Bayat1; Akbar Heidarpour2; Hamed Aghamohammadi3; Rasul Jamshidi1; 1Hamedan University of Technology

C-11: The Effect of α-α Phase Separation due to Thermal Aging on Corrosion Behavior of Duplex Stainless Steels: Pratik Murthi1; KoF Sarfo1; Thomas Wood1; Gerardo Zavala2; Yongfeng Zhang3; Liney Arndottir1; Julie Tucker1; Burkan Isgor2; 1Oregon State University; 2Idaho National Laboratory

C-12: Towards Novel Structural Material Candidates for Application in Liquid Metals: A Behavior of Nb, Ti-V and Fe-Cr-Al Alloys in Pb and Pb-Bi Eutectic: Miroslav Popovic1; Natalia Rubio2; Peter Hosemann3; 1University of California Berkeley

POSTERS

E-6: Conditions for Superplasticity in Precipitation and Strain Hardened Aluminium Alloys before and after Friction Stir Processing: Sweta Saroj1; Murshid Imam1; 1Indian Institute of Technology, Patna

E-7: Connecting Residual Stresses with Friction Stir Welding Conditions and Pseudo-heat Index: Ning Zhu1; Luke Brewer1; 1University of Alabama

E-8: Durability of Friction Stir Welding Tool at High Temperature: Rahul Kesharwani1; Murshid Imam1; Chiranjit Sarkar2; 1Indian Institute of Technology, Patna

E-9: Effect of Tool Shape and Rotational Speed on the Mechanical Properties and Microstructures of Friction Stir Spot Welding in Advanced High Strength Steel: Jong Gun Lee1; Hyun Jun Park2; Sang Ho Uhm3; Seung Boo Jung4; Sungkyunkwan University; 1POSCO

E-10: Friction Stir Welding and Characterization of Magnesium Alloy to Steels: Xiujuan Jiang1; Piyush Upadhay2; Nathan Canfield3; Tim Roosendaal1; 1Pacific Northwest National Laboratory; 2Pacific Northwest National Laboratory

E-11: Friction Stir Welding of Al/C Composites: Seenu Shin1; Seungjoon Lee2; Hidetoshi Fuji3; 1Sunchon National University; 2JWRI

E-12: Hierarchically Microstructured Magnesium WE43-B4C-Y203 Surface Composite through Friction Stir Processing: Kaimiao Liu1; Saket Thapliyal1; Neil MacDonald2; Tianhao Wang3; Shivakant Shukla1; Rajiv Mishra1; 1University of North Texas

E-13: Influence of Travel Speed on Microstructural Features and Mechanical Properties of but Joints Friction Stir Welded SAF 2205 Duplex Stainless Steel: Mohamed Ahmed1; Mohamed El-Sayed Selemann2; Mahmoud Elkady3; 1British University, Egypt; 2Suez University; 3Suez Thermal Power Plant

E-14: Investigation on the Corrosion and Wear Behavior of AlSi601 by Friction Stir Processing with Amorphous and Crystalline States of the SiO2 Nanoparticles: Rosaul Jamshidi1; Hamed Aghamohammadi3; Mehrdad Nemat1; Akbar Heidarpour2; Yoosif Mazaheri1; 1Hamedan University of Technology

E-15: Microstructure and Corrosion Properties of Friction Stir Processed Aluminium Alloys: Devuni Venkateswarlu1; Murali Mohan Cheepu2; P. Nageswara Rao2; Devireddy Krishna1; 1Marri Laxman Reddy Institute of Technology and Management, Telangana; 2Kingsung University, Busan; 3Institute of Aeronautical Engineering, Telangana

E-16: Modelling of the Post Processed Tensile Test in Friction Stir Processed of 7075 Aluminium Alloy Incorporated with Multiwall Carbon Nanotube: Seyed Sojad Mijavadi1; AMH Harmouda2; Ali Ghasemi3; 1University of TehranTehran; 2Qatar University; 3Azad University

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Poster Session

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhay, Pacific Northwest National Laboratory; David Yan, San Jose State University

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E-17: Post Processed Shear Punch Test modeling of Friction Stir Processed AZ81 Magnesium Alloy Incorporated with Multiwall Carbon Nanotube: Seyed Sajad Mirjavadi

E-18: Reduction of Process Forces during Friction Stir Welding with Varying Probe Geometries: Michael Grätzel; Michael Hasiebjer; Torsten Löhnt; Jean Pierre Bergmann; Technische Universität Ilmenau

E-19: Temperature Monitoring and Cooling Rate in Friction Stir Welding of Steels: Md Anwar Ali Ansari; Murshid Imam; Vishwanath Chintapenta; Indian Institute of Technology, Patna; Indian Institute of Technology, Hyderabad

H-6: A Study on the Mechanical Properties of Glass Fiber-epoxy Vinyester Composite with Pultrusion Process depends on Exposure time in Salt Spray Environment: MyeongHan Yoo1; Min Seok Moon1; Jongll Rho1; JoonyHyuk Song1; NaRa Park2; JeHa Oh2; YoonHyuk Bang2; Korea Institute of Carbon Convergence

H-7: Applying Nanotechnology to Separation of Fluoride Gas with Oxygen by Carbon Nano Tube (Monte Carlo Simulation): Mohsen Amerisahouei1; Almahdi-South Hormoz Alumunium

H-8: Barrierless Cu-alloy Seed Integration for Improved Reliability in Solder Bump Flip Chip Applications: Chon-Hsin Lin; Asia Pacific Institute of Creativity

H-9: Rapid Solidification of Impulse Atomized Al-Si-Sc: Akhantshya Sahoo1; Hani Henein1; Abdou-Aziz Bologna1; William Hearnt1; University of Alberta; Chalmers University of Technology

H-10: CFD-simulation of Siphone for Primary Aluminium Production: Mohsen Amerisahouei1; Almahdi-South Hormoz Alumunium

H-11: Control of TiC Particle Size in Combustion Synthesis Method for Reinforcement Particle: Yuichiro Murakami1; Isao Matsui1; Naoki Omura1; National Institute of Advanced Industrial Science And Technology

H-12: Corrosion Resistance of Hot Dipping Al-Zn-Si and Zn-Al-Mg-Si Alloy Coating: Hui Li1; North China University of Science and Technology

H-13: Creation of Mechanical Behaviour Diagrams of Twin Roll Cast Aluminium Flat Products Depending on Different Thermomechanical Processes: Kaan Ipek1; Özen Gürsoy1; Eray Erzi1; Derya Dispinar1; Istanbul University

H-14: The Role of Scientific Publishers in Addressing Gender Disparity in Academic Publishing: Joe D’Angelo1; Marlene Silva1; Rachel Herbert1; Elsevier

H-15: Determination of Mechanical Properties of Boron Oxide Particle Reinforced Aluminum Alloy Matrix Composites: Serap Kekec1; Özen Gürsoy1; Eray Erzi1; Mert Zeraga1; Derya Dispinar1; Istanbul University

H-16: Development of the Sub-frame with Magnesium Alloy through the High-pressure Die-cast Process: Min Seok Moon1; MyeongHan Yoo1; NaRa Park2; JoonyHyuk Song1; Jongll Rho1; JeHa Oh2; WonTae Kim2; YoonHyuk Bang2; Korea Institute of Carbon Convergence Technology

H-17: Effect of Bias Voltage on Structure, Morphology and Hardness of ZnN Coating Deposited by Reactive Magnetron Sputtering: Reza Madanipoor1; Masood Hasheminiasar1; Seyed Morteza Masoudpanah1; IUST

H-18: Effect of Decarbonization Annealing Times on Recrystallization Microstructure, Texture and Magnetic Properties of Nb-containing Grain-oriented Silicon Steel: Yunti Feng1; North China University of Science and Technology

H-19: Effect of Heat Treatment Parameters on Hardness and Microstructure of AISI 4140 and AISI 4150 Steels: Beste Payam1; Selim Erturk1; Cuneyt Arslan1; Istanbul Technical University

H-20: Effect of Heat Treatment Parameters on Hardness and Microstructure of AISI 4140 and AISI 4150 Steels: Beste Payam1; Selim Erturk1; Cuneyt Arslan1; Istanbul Technical University

H-21: Encapsulation of Gold Nanorods with Porphyribins for the Potential Treatment of Cancer and Bacterial Diseases: Nthabeleng Hlapisi1; Tshwabo Montaung1; Linda Linganiso1; Oluwatobi Oluwafemi1; Sandile Songaca2; University of Zululand; University of Johannesburg; University of KwaZulu-Natal

H-22: Evolution Behavior of Thermally Formed d-ferrite in Modified 9Cr-1Mo Steel Weld Zone: Nam-hyun Jung1; Nam-hyun Kang1; Kwangho Kim1; Ikmm Park1; Kyung Mox Cho1; Pusan National University

H-23: Experimental Investigation of AA6061 Composites Reinforced With Fly Ash Fabricated by Friction Stir Processing: Jyoti Menghan1; Sudeep Ingle1; Nikhil Phulari1; S Pambuya1; Satish More1; Dhananjay Bhatt1; S.V. National Institute of Technology; Always Avant

H-24: Fabrication and Mechanical Property Analysis of Nanosphere Ti-Zr-Ni Quasicrystal: Geunhee Yoo1; Ji Young Kim1; Eun Soo Park1; Seoul National University

H-25: High Entropy Alloy Coatings for Erosion Resistance - A Review: Jyoti Menghan1; Sudeep Ingle1; Dhananjay Bhatt1; Satish More1; Akash Vyas1; C Paul1; S.V. National Institute of Technology; Always Avant; Raja Ramanna Centre for Advanced Technology

H-26: Joining of Titanium and Stainless Steel Alloys via the Application of Refractory Metal Interlayers: Katherine Namola1; Antonio Ramirez2; Jerry Gould1; Ohio State University; EWI/Ohio State University

H-27: Mechanical Property Characterization of Carbon Fiber Reinforced 6063 Alloy: Anil Allen1; Özen Gürsoy1; Eray Erzi1; Göçek Hapci Ağaoglu1; Derya Dispinar1; Gökhan Orhan1; Istanbul University

H-28: Microstructure and Mechanical Properties of Beryllium-copper Alloy Plate Modified by Friction Stir Processing: Kwangjin Lee1; KITECH

H-29: Molecular Dynamics Simulations of Carbon Fibers Reinforced Within Polyethylene used to Quantify Decohesion of the Interfacial Region: Sultana Abobtin1; Mark Horstemeyer1; Michael Baskes1; SungKwang Mun2; Andrew Bowman1; Mississippi State University; Center for Advanced Vehicular Systems (CAVS); Center for Advanced Vehicular Systems (CAVS)

H-30: Molten Salt Electrolytic Extraction of Dysprosium using NdFeB Magnet Scraps: Kim Jong Ho1; Rist

H-31: Morphology and Mechanical Properties of Bagasse Nano Particles Reinforced Epoxy Composites: Suleiman Hassan1; Victor Aigbodion1; University of Lagos

H-32: New Tool for Friction Stir Processing: Harith Aljobory1; Steel Industries Co.
H-33: Performance of Low Cost 3D Printed Pylon in Lower Limb Prosthetic Device: Fariborz Tavangarian; Camila Proano; Caleb Zolko; 1Pennsylvania State University

H-34: Phase-field Modeling of Metal Corrosion with Passive Film Formation in Electrolyte: San-Diang Shi; Talha Ansari; 1Hong Kong Polytechnic University

H-35: Production of Sr Master Alloy by Pyrometallurgical and its Modification Capability: Ibrahim Goksel Hızlı; Rasit Sezer; Özen Gürsoy; Cuneyt Arslan; Derya Dispinar; Selim Erturk; 1Istanbul University; 2Karadeniz Technical University; 3Istanbul Technical University

H-36: Research on Influence of Inclusion Size for IGF Inducing in Different Grain Size for Ti-Mg Shipbuilding Steel: Ligen Sun; Huirong Li; Liguang Zhu; 1North China University of Science and Technology

H-37: Sand Casting Of Zr41 Mg Alloy: Ilhan Aygun; Erhan Körpe; Özen Gürsoy; Eray Erzi; Derya Dispinar; 1VIG Metal; 2Istanbul University

H-38: Sequential Leaching Characteristics of Chromium in AOD Slag-based Comestitious Materials: Ya-Jun Wang; Jun-guo Li; Ya-nan Zeng; Xiao-yu Li; 1Northeastern University; 2North China University of Science and Technology


H-40: Study on the Reaction Behavior of Hydrochloric Acid Containing Titanium Blast Furnace Slag: Jiling Long; Hui Li; 1North China University of Science and Technology

H-41: Study on Ultrasonic-assisted Metal 3D printing (UAM3P) for Making Alloys Printable without Defects: Soeed Bagherzadeh; Qingyou Han; Yanfei Liu; 1Purdue University

H-42: The Creep-fatigue Behavior of a Directionally Solidified Ni-based Superalloy DZ445 at 900 °C with High Strain Range: Biao Ding; Wei Li; Jianchao Peng; Tianxiang Zheng; Jianbo Yu; Zhongmin Ren; Yunbo Zhong; 1Shanghai University

H-43: The Edge Dislocation Climbing Mechanism for He Bubble Growth in W. Hongxian Xie; 1Osaka University

H-44: The Effect of Electromagnetic Stirring on the Continuous Casting of Hypereutectic Al-Si Alloy Billets: Kim Jong Ho; 1Rist

H-45: The Effect of Sr Modification on Mechanical Properties and Corrosion Behavior of A360 alloy: Inal Duygu; Gökçe Hapci Agaoğlu; Özen Gürsoy; Eray Erzi; Gökhan Orhan; Derya Dispinar; 1Istanbul University

H-46: Thermodynamic and Kinetic Analysis of Inhomogeneous Distribution of Solute on Precipitations in as Cast Nb-V-Ti Microalloyed Steel: Ya-nan Zeng; Jun-guo Li; Ya-jun Wang; 1North China University of Science and Technology; 2Northeastern University

H-47: Thermoelectric Properties of Amorphous Ti50Cu28Ni15Sn7-dispersed Bi0.4Sb1.6Te3 Fabricated by Mechanical Alloying and Vacuum Hot Pressing: Yee-Yew Lee; 1National Taiwan Ocean University

H-48: Tunable Thermal Expansion Behavior in TbCo2 Based Alloys: Zhanning Liu; 1University of Science and Technology Beijing

H-49: Understanding Tip Material Selection Impact on High Temperature Nanoindentation: Samuel Bacon; Richard Anthony; Phil Webb; Kurt Johanss; Warren Oliver; 1KLA-Tencor

H-50: Utilization of Primary Steelmaking Slag as a Medium for Remediation of Arsenic Contaminated Groundwater: Sumit Suman; K. Abhilash Simhachalam; Somnath Basu; 1Indian Institute of Technology, Bombay

H-51: ZrO2 Doping Effects on the Mechanical and Structural Properties of Nanostructured Forsterite: Fariborz Tavangarian; 1Dakota Mattison; 2Pennsylvania State University

H-52: Microstructural Characterization of Co-sputtered Cu-Ta Alloys as a Function of Processing Conditions: Max Powers; 1University of Michigan

H-53: Heterogeneous Structure Hypereutectic Al- 20 wt.%Si by Laser Surface Remelting: Huai-Hsun Lien; Amit Misra; 1University of Michigan

H-54: Deformation Mechanisms of Crystalline Silicon Nitride Nanomembranes: Ali Khorshaei Sharbgh; Niaz Abdulrahim; 1University of Rochester

H-55: Fracture of Adhesively Bonded Joints between Dissimilar Substrates under Shear: Modelling versus Experiment: Sina Askarinejad; Norman Fleck; 1Cambridge University

H-56: Limits on Transformation Strains for Non-negative Dissipation: Marish Vasoya; Babak Kondori; Amine Benzerga; Alan Needelman; 1Texas A&M University

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Yuntian Zhu, North Carolina State University; Kei Arayama, Ritsumeikan University; Irene Beyerlein, University of California San Diego; Yves Brechet, Grenoble-INP; Huajian Gao, Brown University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

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E-20: Aluminum Sandwich with Heterogeneous Density-graded Open-cell Foam Core: Vasanth Shunmugasamy; Bilal Mansoor; 1Texas A&M University at Qatar

E-21: Controlled Microporosity for Two-phase Flow via Powder Bed Fusion: Scott Roberts; Ben Furst; Stefano Cappucci; Eric Sunada; 1Jet Propulsion Laboratory

E-22: Delamination Studies of Nb-Cu Laminated Composites Processed by Accumulative Roll Bonding: Cesar Mariscal Hernandez; Rayana Snene; Kenneth Liechti; Francisco Garcia-Pastor; 1Cinvestav Unidad Sattillo; 2The University of Texas at Austin

E-23: Design of Non-equatomic FeNiCoAl-based High Entropy Alloys with Heterogeneous Lamella Structure towards Strengthductility Synergy: Cheng Zhang; Chaoyi Zhu; Tyler Harrington; Kenneth Vecchio; 1University of California San Diego

E-24: Development of a Production Chain for Cu-bilayer Products: Tim Mittler; Thomas Greß; 1Technische Universität München

E-25: Effect of Grain Size on Mechanical Properties of Dual Phase Steels Composed of Ferrite and Martensite: Myeong-heom Park; Akinobu Shibata; Nobuhiro Tsuji; 1Kyoto university
E-26: Effect of Martensite Distribution on Deformation Behaviors of Dual-phase Steel. Ryota Matsubayashi; Myeong-heom Park; Nobuhito Tsujii; Kyoto University.

E-28: Frictional Stir Processing and Alloying: A Novel Technique for Fabricating Heterogeneous and Gradient Materials. Tianhao Wang; Rajiv Mishra; University of North Texas.

E-29: Improved Balance between High Strength and High Electrical Conductivity of Copper Alloys through Two-step Cryingroll and Aging. Rengeng Li; Enyu Guo; Huijun Kang; Tongmin Wang; Dalian University of Technology.

E-30: Influence of Ultrasonic Shot-peening on the High and Low Cycle Fatigue Properties in 2205 Duplex Stainless Steel. Yinxin Liu; Yufei Jia; Xiancheng Zhang; East China university of science and Technology.

E-31: Mechanical Behavior and Microstructural Evolution in Gradient Structured Copper Processed through Torsion. Nageshrao Rao Pailkuri; Susmitha Modem; Abhishek Kumar; Rahul Singh; Venkateswari Devuri; Marri Laxman Reddy Institute of Technology and Management; Mohitlal Nehru Institute of Technology, Allahabad; Miritm, Hyderabad.

E-32: Mesoscale Study of the Strength and Ductility in Gradient Materials. Lei Cao; University of Nevada, Reno.

E-33: Mesoscale Structures: Impact Response of Additively Manufactured Interpenetrating Phase Composites. Lauren Poole; Matthew French; William Yarberrry; Zachary Cordero; Rice University.

E-34: Strong and Ductile Electrodeposited Bulk Nanocrystalline Nickel. Yao Yao Jiang; Kai Hu; Jing Zhao; Jun Yi; Laboratory for Microstructures, Institute of Materials, Shanghai University.

E-36: Ultra-high Strength and Ductility in a Ni-Cr-Co Superalloy with a Heterogeneous Structure. Connor Slone; Jiashu Miao; Michael Mills; Ohio State University.

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Poster Session

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory.

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Session Chairs: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, Australian National Science and Technology Organisation; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory.


G-8: In Situ Dual Beam Kr Irradiation and He Implantation in High Entropy Alloys. Jing Hu; Weiyang Chen; Pete Baldo; Mark Kirk; Meimei Li; Argonne National Laboratory.

G-9: Influence of Stored Energy in Ferritic ODS Alloys on the Recrystallization Behavior. Yann De Carlan; Benjamin Hary; Joel Ribis; Amal Issaoui; Adrien Vaugoude; Roland Loger; Thierry Baudin; CEA.

G-11: Irradiation Induced Phase Transformation of Metastable Alloys. Arun Devaraj; Osman El-Aitwan; Libor Kovarik; Meimei Li; Vishal Soni; Rajarshi Banerjee; Vaitihiyalingam Shuthandanand; Pacific Northwest National Laboratory; Los Alamos National Laboratory; Argonne National Laboratory; University of North Texas.

G-12: Low Temperature Radiation Damage and Microstructure Evolution of d-phase 239PuGa Alloys by Neutron Diffraction. Alice Smith; Jianzhong Zhang; Bjorn Claussen; Sven Vogel; Franz Freibert; Donald Brown; Los Alamos National Laboratory.

G-13: Mesoscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in Metallic Fuels. Fergyang Badry; Mohammad Abdoelatef; Sudipta Biswas; Andrea Jokisaari; Daniel Schwenn; Yongfeng Zhang; Karim Ahmed; Texas A&M University; Idaho National Laboratory.

G-14: Microstructural Characterization of High-entropy Alloy Irradiated at Cryogenic Temperatures. Michael Moorehead; Calvin Parkin; Lingfeng He; Jing Hu; Meimei Li; Adrien Couet; Kumar Shridharan; University of Wisconsin-Madison; Idaho National Laboratory; Argonne National Laboratory.

G-15: Microstructural Response of ODS-EUROFER Steel to High Dose Ion Implantation of Helium and Hydrogen. Oleg Emel'yanov; Aurelie Gentilis; Maria Ganchenkova; Yurii Yagodzinsky; Evgenii Mal'titskii; Vladimir Borodin; Pavel Vladimirov; Anton Moeslang; Igor Golovchanskiy; CSNSM, Univ Paris-Sud, CNRS/IN2P3, Universite Paris-Saclay; National Research Nuclear University MEPhI; Aalto University School of Engineering; National Research Center «Kurchatov Institute»; Institute for Applied Materials Physics, Karlsruhe Institute of Technology; National University of Science and Technology MISIS.

G-17: Using Image Analysis to Quantify the Microstructural Changes during Irradiation of U-Mo Fuels with Different Mo Contents. Charlyne Smith; Asssel Atkalkiayev; Brandon Miller; Dennis Keiser; University of Florida; Idaho National Laboratory.

LIGHT METALS

Magnesium Technology 2019 — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmitry Orlov, Lund University; Neale Neelameggham, IND LLC.

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Session Chairs: Eric Nyberg; J. Brian Jordon, University of Alabama.

D-10: Comparison of Corrosion Behavior in Mg-x Al Alloys Containing Ca and Y. Jong Il Kim; Ha Nguyen; Young Min Kim; Korea Institute of Materials Science; Chungnam National University; Korea University of Science & Technology.

D-11: Correlation between Lattice Reorientation and Nature of Alloying Elements in Ti and Mg via ab initio Calculations. Gang Zhou; Hao Wang; Institute of Metal Research Chinese Academy of Sciences.
D-12: Deformation Behavior of a Reticular Structured Mg-O-9Al Alloy Developed by the Phase Separation Process: Donghyun Bae\(^1\), Seung Won Kang\(^2\), \(^3\)Yonsei University

D-13: Development of Magnesium and Magnesium Alloy Materials through Press and Sinter Processing: Steven Johnson\(^1\), Jason Alvarez\(^2\), \(^3\)Central Connecticut State University

D-14: Development of Manufacturing Processes for Magnesium Sheet: Amjad Javaid\(^1\), Frank Czerwinski\(^2\), \(^3\)Cannet, Natural Resources Canada

D-15: Effect of Baffle Plate on Separation Performance in Magnesium Electrolysis Cell Based on Thermo-electro-magneto-hydrodynamics Coupling Model: Cheng-Lin Liu\(^1\), Qian-Wen Zhao\(^2\), Jian-Guo Yu\(^3\), \(^4\)East China University of Scicence and Technology

D-16: Effect of Temperature, Strain Rate, and Strain on Grain Refinement and Texture Development during Dynamic Recrystallization of AZ31B Mg Alloy: Yuan Li\(^1\), Zhenggang Wu\(^2\), Peijun Hou\(^3\), Zhili Feng\(^4\), Yang Ren\(^5\), Hahn Choo\(^6\), \(^7\)University of Tennessee; \(^8\)Oak Ridge National Laboratory; \(^9\)Argonne National Laboratory

D-17: Elucidation of Growth Mechanisms and Control of Morphology in Electrodeposited Magnesium Thin Films: Rachel Davidson\(^1\), Sarbjait Banerjee\(^2\), \(^3\)Texas A&M

D-18: Forging of Mg-3Sn-2Ca-0.4Al Alloy Assisted by its Processing Map and Validation through Analytical Modeling: Pitcheswara Rao Kamireddy\(^1\), K. Suresh\(^2\), Y.V.R.K. Prasad\(^3\), Dharmendra Chalasani\(^4\), Norbert Hort\(^5\), \(^6\)City University of Hong Kong; \(^7\)Bharathiar University; \(^8\)processingmaps.com; \(^9\)University of New Brunswick; \(^10\)Helmholtz-Zentrum Geesthacht

D-19: Formation of Basal Texture Variations in AZ31 Magnesium Alloy during Extrusion: Rongshi Chen\(^1\), M. Jiang\(^2\), H Yan\(^3\), C. Xu\(^4\), T. Nakata\(^5\), S. Kamado\(^6\), E. Han\(^7\), \(^8\)Institute of Metal Research, Chinese Academy of Sciences; \(^9\)Institute of Metal Research, Chinese Academy of Sciences & Shenzhen University; \(^10\)Nagoya University of Technology

D-21: In Situ Characterization of the Deformation Mechanisms Present in Biaxially Loaded Magnesium Alloys: Zachary Brunson\(^1\), Aaron Stebner\(^2\), \(^3\)Colorado School of Mines

D-22: Influence of CNTs Nanoparticles on the Microstructure and Mechanical Properties of Friction Stir Welded AZ21 Magnesium Alloy: Mohammad Alipour\(^1\), Ali Ghasemi\(^2\), Ali Shakiba\(^3\), \(^4\)University of Tabriz; \(^5\)Islamic Azad University Tehran North Branch; \(^6\)University of Tehran

D-23: Mechanical and Corrosion Properties of ECAP-processed Mg ZK60 Alloy: Francisco Farias Gonzalez\(^1\), Francisco Garcia\(^2\), \(^3\)cinvestav

D-24: On the Microstructure Characterization and Shear Punch Properties of the AZ81 Magnesium Alloy Welded by FSW: Mohammad Alipour\(^1\), Ali Ghasemi\(^2\), Ali Shakiba\(^3\), \(^4\)University of Tabriz; \(^5\)Islamic Azad University Tehran North Branch; \(^6\)University of Tehran

D-25: Refill Friction Stir Spot Welding of High Strength 7050 Aluminum Alloy: Uceu Suhuddin\(^1\), Jorge dos Santos\(^2\), \(^3\)Helmholtz Zentrum Geesthacht

D-27: Sequential Double Twinning Associated with Twin-twin Interactions in Shocked Hexagonal Metals: Shun Xu\(^1\), \(^2\)University of Nebraska-Lincoln

D-28: Study of the Mechanical Properties and Formability of Binary Mg-xCa/RE Alloys: Young-Wook Chae\(^1\), Jun-Ho Park\(^2\), Jae-Joong Kim\(^3\), Jaiveer Singh\(^4\), Min-Seong Kim\(^5\), Shi-Hoon Choi\(^6\), \(^7\)POSCO; \(^8\)Sunchon National University, Suncheon

D-29: Tailoring Twin Boundary Mobility in Magnesium and its Alloys: Yujie Cui\(^1\), Yunping Li\(^2\), Yuichiro Koizumi\(^3\), Akihiko Chiba\(^4\), \(^5\)Tohoku University; \(^6\)Central South University; \(^7\)Osaka University

D-30: Texture and Microstructure Evolution of AZ31 Mg Sheet during Tensile Draw-bending: Jaehyung Choi\(^1\), G. Y. Lee\(^2\), K.J. Yeom\(^3\), \(^4\)Korea Institute of Materials Science

D-31: Texture Evolution and Recrystallization of Cold-rolled Mg-Al-Zn-Ca Alloy Sheets: Su Mi Jo\(^1\), Yohan Goi\(^2\), Jong Il Kim\(^3\), Bong Sun You\(^4\), Young Min Kim\(^5\), \(^6\)Korea University of Science and Technology; \(^7\)Chungnam National University; \(^8\)Korea Institute of Materials Science

D-32: The Effect of Alloy Elements on Oxidation Behavior of Magnesium Alloys: Jiajia Wu\(^1\), Yuan Yuan\(^2\), Fusheng Pan\(^3\), Hans Seifert\(^4\), \(^5\)Chongqing University; \(^6\)Karlsruhe Institute of Technology

D-33: The Relationship between Long-period Stacking-ordered Structure (LPSO) and Deformation Behavior at Different Strain Rates in Magnesium Rare Earth Alloys: Kun Li\(^1\), R.D.K. Misra\(^2\), \(^3\)University of Texas at El Paso

D-34: Twinning-dewinning in Shock Compressed UFG AM602 Magnesium via Time-resolved In-situ Synchrotron X-Ray Diffraction: Cyril Williams\(^1\), Chaitanya Kale\(^2\), Kiran Solanki\(^3\), \(^4\)U.S. Army Research Laboratory; \(^5\)Arizona State University

MATERIALS PROCESSING

Materials Processing Fundamentals — Poster Session

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allannore, MIT - DMSE; Samuel Wagstaff, Novelis

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E-38: High-temperature Study of Perovskite Evaporation: Sergey Shromilov\(^1\), \(^2\)Vernadsky Institute of Geochemistry of RAS

E-39: Numerical Simulation of Agglomeration Behavior of Sintered Raw Materials during High-speed Mixing: Shanshan Wu\(^1\), Guisheng Pei\(^2\), Gang Li\(^3\), Xuewei LV\(^4\), \(^5\)Chongqing University

E-40: Overview of Electrically Activated Reactive Synthesis (EARS) of nanotube reinforced intermetallics: Kaiatin Keht\(^1\), Vanessa Bundy\(^2\), Mehul Chauhan\(^3\), Prathmesh Modl\(^4\), John Walker\(^5\), Kevin Yokota\(^6\), Greg Essayan\(^7\), Saman Sharifi\(^8\), Stephanie Halbert\(^9\), K. Morsli\(^10\), \(^11\)San Diego State University

E-41: Tensile Properties and Microstructure of Squeeze Cast Magnesium Matrix Composite Reinforced with 35 Vol. % of Al203 Fibers: Hongfa Hu\(^1\), \(^2\)University Of Windsor

E-42: The Application Prospect of Microwave Sintering Technology in the Preparation of Ti - Base Composite Materials: Xu Wang\(^1\), Yilong Liao\(^2\), Ling Xie\(^3\), Qiang Su\(^4\), \(^5\)Mingde College of Guizhou University

E-43: Ultrasound for Next-generation Alloy Casting: Bitolong Wang\(^1\), Andrew Caldwell\(^2\), Antoine Allannore\(^3\), Douglas Kelley\(^4\), \(^5\)University of Rochester; \(^6\)Massachusetts Institute of Technology
NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Poster Session

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

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Session Chair: Clarissa Yablinsky, Los Alamos National Laboratory

G-18: Comparison of In-situ Micro- and Ex-situ Mesoscale Tensile Testing for Evaluation of Mechanical Properties of Stainless Steels: Tanvi Ajantiwalay; Hi Vo; Peter Hosemann; Assel Aitkaliyeva; 1University of California Berkley

G-19: Damage Evolution Characterized with In Situ Ion Beam Irradiation Transient Grating Spectroscopy: Cody Dennett; Khalid Hattar; Michael Short; 1Massachusetts Institute of Technology; 2Sandia National Laboratories

G-20: Grain Boundary Oxidation and Gas Release on Irradiated 1Steel at High Irradiation Doses and Temperatures: Md Mehadi Hassan; Connor Rietema; Madhavan Radhakrishnan; Zhexiong Zhang; Kester Clarke; Amy Clarke; Eda Aydogan; Yongqiang Wang; Osman Anderoglu; 1University of New Mexico; 2Colorado School of Mines; 3Los Alamos National Laboratory

G-21: Interaction between the Hydrogen Retention and Dislocation Reconstruction in Tungsten: a QM/MD Study: Yinan Wang; Ben Xu; Wei Liu; 1Tsinghua University

G-22: Investigating the Effects of Existing Damage on Primary Damage Formation in Zirconium: Jesse Carter; Richard Smith; 1Bettis Laboratory

G-23: Investigation of Susceptibility of A533B Steel to Temper Embrittlement: Mihail Sokolov; 1Oak Ridge National Laboratory

G-24: Irradiation Resistance of Advanced Ferritic/Martensitic Steel at High Irradiation Doses and Temperatures: Md Mehadi Hassan; Connor Rietema; Madhavan Radhakrishnan; Zhexiong Zhang; Kester Clarke; Amy Clarke; Eda Aydogan; Yongqiang Wang; Osman Anderoglu; 1University of New Mexico; 2Colorado School of Mines; 3Los Alamos National Laboratory

G-25: Irradiation Resistance of ARB Processed CuNb Nanolayered Composites at Very High Doses and Temperatures: Zhexiong Zhang; Madhavan Radhakrishnan; Md Hassan; Nathan Mara; Yongqiang Wang; Osman Anderoglu; 1University of New Mexico; 2University of Minnesota; 3Los Alamos National Laboratory

G-26: Microstructural Evolution of High Density W-Cermets Exposed to Flowing Hydrogen at Temperatures Exceeding 2000 K: William Carpenter; Kelisa Benensky; Marvin Barnes; Dennis Tucker; 1South Dakota School of Mines & Technology; 2NASA Marshall Spaceflight Center

G-27: Towards Accurate Molecular Dynamics Simulations of Helium Bubble Nucleation in Palladium Tritide: Xiaowang Zhou; Norman Bartelt; Ryan Sills; 1Sandia National Laboratories

G-28: Ultrastrong and Ductile Amorphous Si-O-C alloys: Kaisheng Ming; Qing Su; Jian Wang; 1University of Nebraska, Lincoln

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Poster Session

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, INDE LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

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Session Chair: Gisele Azimi, University of Toronto

E-44: Recovery of Scandium by Leaching Process from Brazilian Red Mud: Amilton Botelho Junior; Raquel Costa; Denise Espinosa; Jorge Tenório; 1University of São Paulo

E-45: Sorption of Uranium with the Application of New Modified Sorbents Based on Natural Minerals: Ainur Berkimbayeva; Bagdatsuilet Kenezhapiyev; Tatyana Surfokova; Marzhan Chukmanova; 2JSC Institute of Metallurgy and Ore beneficiation; 1JSC The Kazakh National Research Technical University after K.I. Satpaev

E-46: Research on the Carbothermic Reduction Procedure of SrSO4 with Carbon: Simon Chen; Dongping Duan; Xingwu Zou; 1Chinese Academy of Sciences

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell’s 80th Birthday — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

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E-47: Aluminum Matrixed Graphene Reinforced Composite Materials: Ohran Aydin; Aziz Kocavel; Özen Gürsoy; Eray Erzi; Derya Dispina; 1Istanbul University

E-48: Influence of Melt Quality on the Fluidity of AlSi12Fe: Ibrahim Goksel Hizli; Meltem Saltik; Ibrahim Kalkan; Derya Disipin; 1Istanbul University
LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Poster Session

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Gian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

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D-35: Development of New Magnesium Alloy Strengthened by Nano Second Phase Precipitation: Yuansheng Yang; Tianjiao Luo; Minglin He; Shaozhen Zhu; Jixue Zhou; Shouqiu Tang; 1Institute of Metal Research, Chinese Academy of Sciences; 2Advanced Materials Institute, Shandong Academy of Sciences

D-36: Issues of Castability of Magnesium Alloys: Norbert Hort; Muhammad Bilal; Mark Easton; Hajo Dieringa; 1Helmholtz-Zentrum Geesthacht; 2RMIT University

LIGHT METALS

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Poster Session

Sponsored by: DGM (Deutsche Gesellschaft für Materialkunde eV); TMS: Magnesium Committee, TMS: Aluminum Committee

Program Organizers: Eric Nyberg, Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

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D-37: Analysis of the High Purity Aluminum Purification Process Using Zone-refining Technique: Heli Wan; Baociang Xu; Jinyang Zhao; Bin Yang; Yongnian Dai; 1National Engineering Laboratory for Vacuum Metallurgy

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillon, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, CSIRO; John Howarter, Purdue University; Neale Neelameggham, IND LLC

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I-21: Characterization of Polymeric Solutions with TiO₂ Photocatalytic Conversion Efficiency Exposed to Different CO₂ Sources: Aline Hernández; Natalia Loera; Gerardo Pérez; Francisco Blockstrand; 1Facultad de Ingeniería, Universidad Anáhuac México; 2Fototecnomías Sostenibles para México, S. A. de C. V.; 1Plur

I-22: Vinylic and Waterproofing Paint with TiO₂ as Photocatalytic Active Effects in Lolium perenne Germination: Aline Hernández; Natalia Loera; Gerardo Pérez; Francisco Blockstrand; 1Facultad de Ingeniería, Universidad Anáhuac México; 2Fototecnomías Sostenibles para México, S. A. de C. V.; 1Plur

I-23: Comparison between Lactuca sativa L. and Lolium perenne: Phytoextraction Capacity of Ni, Fe and Co from Galvanoplastics Industry: Aline Hernández; Natalia Loera; Maria Contreras; Luis Fischer; 1Facultad de Ingeniería, Universidad Anáhuac México

I-24: Determination of Limiting Current Density, Plateau Length and Ohmic Resistance of a Heterogeneous Membrane for the Treatment of Industrial Wastewaters with Copper Ions in Acid Media: Kayo Barros; Jorge Tenório; Valentin Pérez-Herranz; Denise Espinosa; 1University of São Paulo (USP); 2Universitat Politècnica de València (UPV)

I-25: Effect of pH and Potential in Chemical Precipitation of Copper by Sodium Dithionite: Iara Anes; Amilton Botelho Junior; Jorge Tenório; Denise Espinosa; 1Escola Politécnica da Universidade de São Paulo

I-26: Influence of Proportion of Pellet on Burden Distribution: Jiansheng Chen; Haibin Zuo; Jingsong Wang; Qingguo Xue; Jiapeng Liang; 1University of Science and Technology Beijing

I-27: Post-combustion Carbon Capture Technology Using CO₂ Separative Membrane and Their Industrial Application: Jung Lee; Jong-Ho Moon; Dahun Lee; Woong Jin Oh; Jeong-gu Yeo; 1Korea Institute of Energy Research

I-28: Preparation and Characterization of Manganese-based Catalysts for Removing NO under Low Temperatures: Kaijie Liu; Qingbo Yu; Junbo San; Zhicheng Han; Qin Qin; 1Northeastern University

I-29: Study of Separation between CO with H2 on Carbon Nanotube by Monte Carlo Simulation in Aluminum Smelter: Mohsen Amerisiahooei; 1Almahdi-Souh Hormoz Aliminium

I-30: The Characterizations of Hydrogen From Steam Reforming of Bio-oil Model Compound in Granulated Blast Furnace Slag: Xin Yao; Qingbo Yu; Guowei Xu; Qin Qin; Ziwen Yan; 1Northeastern University
I-31: Thermodynamic and Economic Assessment of an Air-Brayton/ORC Combined Cycle for Microreactors: Joseph Litrel; Donna Guillet; Michael McKellar; Georgia Institute of Technology; Idaho National Laboratory; University of Idaho

I-32: Determination of Crystallite Size and Its Effect on Sulfar Content, CO2 Reactivity, and Specific Electrical Resistance of Coke: Mohsen Amerisathee; Borzu Bahrvard; Almahdi-South Hormoz Aluminium Smelter

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS


Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoun Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoun Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; SungWoo Nam, University of Illinois at Urbana-Champaign

N-1: Adsorption of Fluoride Gases in Aluminum Production Using Nano Technology: Mohsen Amerisathee; Almahdi-South Hormoz Aluminium

N-3: Biosynthesis and Deposition of Golden Nanoparticles (AuNPs) on Activated Carbon: Laura Garcia-Hernandez; Jacqueline Ramirez-Castro; Begoña Aguilar-Perez; Pedro Alberto Ramirez-Ortega; Mizraym-Uriel Flores-Guerrero; Diana Arenas-Islas; Universidad Tecnológica de Tulancingo; Universidad Autónoma de Baja California

N-4: Crystallization and Melting of Polar and Nonpolar Polymer Chains on Graphene Oxide-substrate: Wei Gao; Arman Ghasemi; University of Texas at San Antonio

N-5: Effect of the Synthetic Parameter on the Cytotoxicity of CdTe/CdSe Nanoparticles against Osteosarcoma Cell Line: Vuyetwa Ncapayi; Sandile Songca; Samuel Oluwafemi; Walter Sisulu University; University of Zululand; University of Johannesburg

N-6: Engineered Nanocomposite Material Properties in Embedding of Smaller Nanoparticles in a Polymer Matrix: Sanju Gupta; A. Henson; Western Kentucky University

N-7: Experimental Study on Competitive Adsorption of SF6 Decomposed Components on Nitrogen Doped TiO2 Nanotubes Sensor: Jun Zhang; Xiaofeng Zhang; Hao Cui; Guozhi Zhang; State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University; School of Electrical Engineering, Wuhan University

N-9: Fabrication of Monodispersed Needle-sized Hollow Core Polystyrene Microspheres: Stanley Ormorge; Esther Ikhuvia; Hilary Ifijen; Aireguemau Agbodbion; Aline Simo; Malik Maaza; Rubber Research Institute of Nigeria; University of Benin, Benin City, Nigeria; Nanosciences African Network (NANOAFNET), iThemba LABS-National Research Foundation

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Poster Session

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surajit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

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Session Chair: Surajit Gupta, University of North Dakota

I-33: Conversion of Soybean Waste to Activated Carbon Spheres for Electrical Double Layer Capacitors: Fuqian Yang; University of Kentucky

I-34: Enhanced ZT in Si by Using SiC Dispersoids to Tune Both Electrical and Phonon Transport Properties: Seyed Aria Hossein; Jackson Harter; Devin Coleman; Todd Palmer; Lorenzo Mangolini; Alex Greeney; University Of California, Riverside; Oregon State University
I-35: Facile Synthesis of Mesoporous NiCo2O4 Fibers with Enhanced Photocatalytic Performance for the Degradation of Organic Dyes under Visible Light Irradiation: Yuchi Wan1; Jun Chen2; Jing Zhan2; Yalin Ma2; 1Central South University

K-1: Additive Manufactured Metal Lattices for Large Deformation and Crash Applications: S. Luong1; S.D. Meshram1; S. Basso1; J. Singh1; M. Tarusna1; Mamidala Ramulu1; Junlan Wang1; Mitchell Mellor2; Dwayne Arata1; 1University of Washington; 2The Boeing Company

K-2: Analysis of Microscopic Strain Distribution in Steel Bar with Load by Neutron: Tomohiro Itoeda1; Andrew Payzant2; Jeffrey Bunn1; Christopher Fancher1; Alan Seld1; Tatsuya Okayama1; Takashi Katsurai1; 1Honda R&D Co., Ltd.; 2Oak Ridge National Laboratory; 3Honda R&D America Inc.

K-3: Atomatic Thermodynamic Force Calculation for Deformation Prediction: Mulaine Shift1; Michael Mills1; Maryam Ghazisaeidi1; Peter Anderson1; 1Ohio State University

K-4: Deformation Driven Grain Growth in ECAE processed AZ31B: Nicholas Krywopus1; Laszlo Kecskes1; Timothy Wehls1; 1Johns Hopkins University

K-5: Effect of Microstructure and Martensite Formation on the Residual Stress Development and Formability of Metastable Austenitic Stainless Steel: Peijun Hou1; Yuan Li1; Dongchul Chae1; Jun-Sang Park1; Yang Ren1; Ke An1; Hahn Choo1; 1The University of Tennessee; 2POSCO Technical Research Laboratory; 3Argonne National Laboratory; 4Oak Ridge National Laboratory

K-7: Insights into In-plane Compression Testing of Aluminum Alloy 2024 and AISI 1008 Steel Sheet Materials: Dilip Banerjee1; Mark Ladicola1; Chris Calhoun1; William Luecke1; 1National Institute of Standards and Technology

K-8: Measuring the Partitioning of Plastic Strain in Precipitation-strengthened Alloys: Robert Jones1; Fabio Di Gioacchino1; Hojun Lim2; Thomas Edwards3; Caspar Schwalb1; Corbett Battaile1; William Clegg1; 1Department of Materials Science and Metallurgy, University of Cambridge; 2Department of Computational Materials and Data Science, Sandia National Laboratories; 3EMPA – Swiss Federal Laboratories for Materials Science and Technology

K-9: Modeling Crystal Plasticity of Niobium: Eureha Pai Kulyadi1; Philip Eisenlohr1; Krishnendu Mukherjee1; Thomas Bieler1; 1Michigan State University; 2Council of Scientific and Industrial Research- National Metallurgical Laboratory

K-10: Modeling the Critical Dynamic Recrystallization of a Ti-22Al-25Nb Alloy during Hot Compression Deformation: Yu Sun1; Lianxi Hu1; 1Harbin Institute of Technology

K-11: Multiscale Quantitative Mapping of Deformation on Grain Level with X-ray Microscopy: Mustafaan Kutsoli1; Can Yildirim2; Phil Cook3; Carsten Detlefs3; Henning Poulsen3; 1European Synchrotron Radiation Facility; 2Technical University of Denmark

K-12: Quasi-plastic Zone Characterization of Regular and Sided Boron Carbide: Sisi Xiang1; Bruce Yang1; Richard Haber2; Kelvin Xie2; 1Texas A&M University; 2Rutgers University

K-13: Role of Hierarchical Martensitic Microstructure on Localized Deformation and Fracture of an Lath-martensitic Steel under Impact Loading at Different Temperatures: Arya Chatterjee1; Abhiraj Ghosh1; Debayal Chakrabarti1; Rahul Mitra1; 1School of Engineering, Brown University; 2Indian Institute of Technology Indore; 3Indian Institute of Technology Kharagpur

K-14: Simple and Accurate Method to Calculate Circular Dichroism Spectra of Peptides and Proteins in Molecular Dynamics Simulations: Juan Liu1; Zewei Wang2; Shougang Research; 1Eiffel Steel, Ain El-Sokhna; 2Eiffel Steel, Ain El-Sokhna

K-15: Stacking Fault Energies in Austenitic Stainless Steels: Benjamin Neding1; Peter Hedström2; 1Royal Institute of Technology

K-16: Understanding Fundamental Mechanisms of Abrasive Wear: An In-Situ Study: Gianluca Roscioli1; Cemal Tasan1; 1Massachusetts Institute of Technology

ADVANCED MATERIALS

Advanced High-Strength Steels III — Poster Session

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; Mingxin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

J-1: Characterization of Advanced High Strength Steel Using Microalloying Elements: Osama Alfy1; Ahmed Abdelaziz2; Ayman Fathy1; Ahmed Gomaa1; 1Materials Engineering Department, German University(GUC) in Cairo; 2Ezz Flat Steel, Ain El-Sokhna

J-2: Effect of Inclusions Modified by Y-based Rare Earth on the Corrosion Behavior of EH36 Shipbuilding Steel: Maolin Ye1; Xiaojun Xi1; Libin Zhu1; Shufeng Yang1; Jingshe Li1; 1University of Science and Technology Beijing

J-3: Effect of Prior Ni Plating on Selective Oxidation Behavior and Galvanisability of High Strength Steel: Guangrui Jiang1; Haiquan Wang1; 1Shougang

J-4: Microstructure and Mechanical Properties of Intercritical Annealed Multiphase Ultrahigh Strength Steel: Liu Huasai1; 1Shougang Research Institute of Technology

J-5: Research on the Microstructure and Mechanical Properties of 980MPa Complex Steel: Chun Qian Xie1; 1Shougang Research Institute of Technology

J-6: The Effect of Ni and Cu Addition on Mechanical Behavior of Thermomechanically Controlled Processed HSLA X100 Steels: Alireza Hosseini Far1; Seyyed Hashem Mousavi Anijdan1; M Abbasi1; 1Department of Materials Engineering, Science and Research Branch, Islamic Azad University; 2Islamic Azad University; 32KNT University of Technology
ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Poster Session

**Sponsored by:** Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM

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**Session Chair:** Alex Leary, Glenn Research Center

I-36: Crystallization and Hot Extrusion Densification of Amorphous Nd2Fe14B and Nanocrystalline α-Fe Powders Fabricated by Mechanical Milling: Jufu Jiang1; Ying Wang1; 1Harbin Institute of Technology

I-37: Effects of Nitrogen Additions on Soft Magnetic Properties of Fe-based Amorphous Alloy: Song-Yi Kim1; A-young Lee1; Hwi-Jun Kim1; Min-Ha Lee1; 1Korea Institute of Industrial Technology

I-38: Engineering of Magnetic Properties of Co-rich Microstructures by Joule Heating: Paula Corte-Leon1; Valentina Zhukova1; Mihail Ipatov1; Juan Blanco2; Julian Gonzalez2; Arcady Zhukov3; 1Dept Phys Mater, University Basque Country; 2Dept Appl Phys, University Basque Country

I-39: Magnetoelastic Effect of Sintered Binder Jet 3D Printed Ni-Mn-Ga-Cu for Efficient Magnetic Refrigeration: Rafael Rodriguez De Vecchis1; Erica Stevens1; Markus Chmielus1; 1University of Pittsburgh

I-40: Micromagnetic Simulation for Exchange Coupling Effect and Magnetic Properties of SmCo5/a-Fe Nanocomposite Magnets: Lianxi Hu1; Yu Sun1; Yuan Yuan1; 1Harbin Institute of Technology

I-41: Structure and Magnetic Properties of Magnetically Soft FeCoBi Alloy after Crystallisation of Amorphous Ribbon by Ultra-Rapid Annealing: Maciej Kowalczyk1; Jaroslaw Ferenc1; Jaroslaw Kusmierzcyk1; Przemyslaw Zackiewicz1; Aleksandra Kolano-Burian1; Tadeusz Kulik1; 1Warsaw University of Technology; 2Institute of Non-Ferrous Metals

I-42: The Influence of Mn Chemical Partitioning on the Partial Crystallization Behavior in CoFeMnSiBn Soft Magnetic Materials: Alicia Wadsworth1; Kayla Cole1; Abhishek Srivastava1; Alex Leary1; Ronald Noebe1; Tim Mewes1; Claudia Mewes1; Gregory Thompson1; 1University of Alabama; 2NASA GRC

**ELECTRONIC MATERIALS**

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Poster Session

**Sponsored by:** TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

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**Session Chairs:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, The University of Queensland

L-1: A Study on TLP Bonding Using Metal-deposited Preforms for Power Modules of Automobile: Seungliu Baek1; Gyu-Won Jeong2; Dae Young Park1; Byung-Suk Lee3; Han-Bo-Ram Lee3; Yong-Ho Ko2; 1Korea Institute of Industrial Technology; 2Incheon National University

L-2: Interfacial Phenomena Between Liquid Ga-based Alloys and Ni Substrate: Tomasz Gancorcz1; Katarzyna Berent1; Norbert Schell1; Robert Chulist1; 1Institute of Metallurgy and Materials Science PAS; 2AGH University of Science and Technology, Academic Centre for Materials and Nanotechnology, Krakow, Poland; 3Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Max-Planck, Germany

L-3: Microstructure Formation in Sn-Cu Based Lead-free Solder Paste Transient Liquid Phase Sintering during Soldering on Different Substrate: R. Mohd Said1; M.A.A. Mohd Salleh2; M.I.I. Ramli1; M.N. Derman1; N. Saud1; H. Yasuda3; K. Nogita1; 1Universiti Malaysia Perlis; 2Kyoto University; 3The University of Queensland (UQ)

L-4: Multi-phase-field Simulation of Electromigration in Polycrystalline Interconnect Line: Akimitsu Ishii1; Akinori Yamanaka1; 1Tokyo University of Agriculture and Technology

L-5: PCB Surface Finish in Press-fit Interconnections: Chulmin Oh1; Sangjoo Oh1; Won Sik Hong1; 1Korea Electronics Technology Institute
CHARACTERIZATION

Advanced Real Time Imaging — Poster Session

**Sponsored by:** TMS: Alloy Phases Committee

**Program Organizers:** Jinichiro Nakano, US Department of Energy; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuitoai Zhang, Southern University of Science and Technology; Nesilhan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

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**Session Chair:** Srujan Rokkam, ACT Inc.

**K-17:** Real-time Imaging of Laser-induced High-velocity Microparticle Impacts: David Veysset; Yuchen Sun; Mostafa Hassani-Gangaraj; Steven Kool; Alex Hsieh; Alexei Maznev; Shawn Cole; Randy Mrozek; Joseph Lenhart; Jan Andzelm; Christopher Schuh; Keith Nelson; 1Massachusetts Institute of Technology; 2U.S. Army Research Laboratory

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Poster Session

**Sponsored by:** TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

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**Session Chair:** Srujan Rokkam, ACT Inc.

**M-1:** A Platform for Crystal Plasticity Finite Element Coding with FEniCS: Fabio Di Gioacchino; 1Department of Materials Science and Metallurgy, University of Cambridge

**M-2:** Validation of a 3D Numerical Model for Stability Analysis of Recrystallized Metals by Coupled Crystal Plasticity and Phase-field Model: Kyung Mun Min; Wookjin Jeong; Pil-Ryung Cha; Heung Nam Han; Seung-Hyun Hong; Myoung-Gyu Lee; 1Seoul National University; 2Kookmin University; 3Hyundai Motor Company

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Student Poster Session

**Sponsored by:** TMS: Alloy Phases Committee

**Program Organizers:** Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

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**Session Chair:** Sinn-wen Chen, National Tsing Hua University

**L-6:** Carrier Mobility of Mg2Si, PbTe and SnTe from First Principles Calculations: Fanchen Meng; Jinlong Ma; Jian He; Wu Li; 1Clemson University; 2Shenzhen University

**L-7:** Evaluation of Ni-P Diffusion Barrier for Thermoelectric Materials: Chun Hsien Wang; Wen Chih Lin; Albert T. Wu; 1National Central University

**L-8:** First-principles Study of the Layered Thermoelectric Material TiNBr: Shuofeng Zhang; Ben Xu; 1Tsinghua University

**L-9:** High Thermoelectric Performance in La-doped n-type Mg3SB1.5Bi0.5: Kazuki Imasato; Max Wood; G. Jeffrey Snyder; 1Northwestern University

**L-10:** On the Thermoelectric Properties of REB66 (RE = rare earth) Compounds for High-temperature Applications: Philipp Sauerschlag; Jean-Baptiste Vaney; Takaho Tanaka; Toetsu Shishido; Takao Mori; 1NIMS; 2Tohoku University

**L-11:** Phase Diagrams of Materials Systems with Quasicrystalline Phases: Pei-chia Lo; Tse-yang Huang; Tzu-ning Kuo; Anbalagan Ramakrishnan; Sinn-wen Chen; 1Department of Chemical Engineering, National Tsing Hua University; 2Department of Chemical Engineering, National Tsing Hua University; 3High Entropy Materials Center, National Tsing Hua University
L-12: Phase Formation of Zn4Sb3 in Spark Plasma Sintering and Thermoelectrical Study: Yamei Liu1; Dongwang Yang2; Myles McKenna3; Jian He1; Xinfeng Tang2; 1Clemson University; 2Wuhan University of Technology

L-13: Thermoelectric Properties of YAl1B6 Prepared by Reactive Spark Plasma Sintering: Hyoung-Won Sot; Quansheng Guo; Takao Mori; 1National Institute for Materials Science

J-9: Adjacent Indentation Investigation on Shear Bands Interaction of Metallic Glass via Molecular Dynamics Simulations: Dan Zhao1; Hongwei Zhao2; 1Jilin University

J-10: An Analysis of Configuration Entropy Effect on the Properties in a Series of Equiatomic Ratio Metallic Glasses: Jung Soo Lee1; Hyun Seok Oh1; Wan Kim2; Jin Yeon Kim3; Eun Soo Park1; Jia Jun Gu4; KeFu Yao5; Budaaraj Srinivas Murty6; 1Seoul National University; 2Tsinghua University; 3Indian Institute of Technology Madras

J-11: Deformation and Hardening Behavior in the Amorphous Alloys and Quasicrystal with the Same Chemical Compositions: Wan Kim2; Eun Soo Park1; 1Seoul National University

J-12: EBSD Microstructure Mapping of Zr47.5Cu45.5Al5Co2 Bulk Metallic Glass Matrix Composite to Ascertain the Effect of Inoculation in Promoting Crystallinity: Muhammad Rafique1; Milan Brandl1; Mark Easton1; 2RMIT University

J-13: Effect of Intrinsic Factors on Size-dependent Deformation Behavior of Metallic Glasses: Ji Young Kim1; So Yeon Kim1; Jin Wook Kim1; Eun Soo Park1; 1Seoul National University; 2Massachusetts Institute of Technology

J-15: Fabrication of Micro- and Nanoscale Metallic Glassy Tubes: Jing Zhao1; Yao Yao Jiang1; Kai Hu1; Jun Yi1; 1Laboratory for Microstructures, Institute of Materials, Shanghai University

J-16: Glass Formation and Crystallization in CuZrAl Alloys: Ivan Kaban1; 1IFW Dresden

J-17: High Strength Nanostructured Mg-based Alloy through Optimized Crystallization of Rapidly Quenched Amorphous Precursors: Hyun-Ah Kim1; Song-Yi Kim1; A-Young Lee1; Min-Ha Lee1; 1KITech

J-18: Tensile Behavior of Cu-coated Pd40Cu30Ni10P20 Metallic Glassy Wire: Kai Hu1; Ishitaqib Hussen2; Yao Yao Jiang1; Chan K.C.3; Jun Yi1; 1Laboratory for Microstructures, Institute of Materials, Shanghai University; 2Department of Chemistry, Karakoram International University; 3Department of Industrial and System Engineering, The Hong Kong Polytechnic University

L-19: High-resolution Multi-modal Imaging Capability at the Hard X-ray Nanoprobe Beamline of NSLS-II: Xiaojing Huang1; Hanfei Yan1; Evgeny Nazaretski2; Mingyuan Ge3; Petr Ilinskii2; Yong Chui3; 1Brookhaven National Laboratory

K-19: A Study of the Load Stages by the Displacement of Mortars Composed of Ornamental Stone Residues by the Method of Squeeze Flow: Pamela Moreira1; Letícia Ciribelli1; Gustavo Xavier1; Jonas Alexandre3; Gabrieilł Abyssedo4; Afonso Azevedo2; Sérgio Monteiro2; Euzébio Zanelato1; Markus Marvila5; 6UNEF; 7Instituto Federal Filiminense

K-20: Alloying and Annealing Effects on Grain Boundary Character Evolution of Al Alloy 7075 Thin Films: An ACMET-ALM Analysis: Prashant Pargaj1; Ruben Mendoza-Cruz1; Miguel Yacaman1; Arturo Ponce1; 1University of Texas at San Antonio

K-21: Alpha Alumina Synthesis Using Gamma-alumina Powders: Antonio Munhoz1; Gustavo Galhardo1; Fernando dos Santos Ortega1; Nelson Batista de Lima1; Dénison Angelotti Moraes2; Leila Figueiredo de Miranda3; Francisco Rolando Valenzuela-Diaz4; 1U.P.Mackenzie; 2FEI; 3IPEN; 4USP

K-22: An Investigation of Mechanical and Thermal Properties of Polypropylene Reinforced with Different Clays: Alex Monteiro1; Dalil Barreira1; Jaqueline Silva1; René Oliveira1; Francisco Valenzuela Diaz1; Esmerindia Moura1; 1Nuclear & Energy Research Institute; 2University of Sao Paulo
K-23: Analysis by Thermoelectric Potential of a Nitrided Steel: Ariosto Medina1; Claudio Aguilar2; Luis Béjar3; Héctor Carreón1; Joaquín Oseguera1; 1Universidad Michoacana de San Nicolás de Hidalgo; 2Universidad Técnica Federico Santa María; 3Instituto Tecnológico y de Estudios Superiores de Monterrey Campus Estado de México

K-24: Analysis of Relationship between Properties of Mechanically Alloyed Powders and Corresponding Process Parameters: Jovana Ružić1; Nikolay Stoimenov1; Stanislav Gyošhev1; Dimitar Karastoyanov1; 1ICT - Bulgarian Academy of Sciences

K-25: Analysis of Rheological Behavior by the Method Squeeze Flow in Mortars Incorporated with Ornamental Stone Residue: Gustavo Xavier1; Gabriely Azevedo1; Pamela Moreira1; Leticia Ciribelli1; Afonso Azevedo1; Jonas Alexandre1; 1UNESP; 2Instituto Federal Fluminense

K-26: Analysis of the Feasibility of the Use Waste from the Foundry Process in Green Sands in the Manufacturing of Soil-cement Blocks: Niander Cerqueira1; Victor Souza1; Guilherme Coutinho1; Lucas Silva1; 1Centro Universitário Redentor

K-27: Analysis of the Life Extension of ASTM a-36 Steel Structures Using the Concepts of Fracture Mechanics: Kayan Carneiro1; Victor Souza1; Niander Cerqueira1; Lucas Costa1; Amanda Lima1; Afonso Azevedo1; Daniel Gallo1; 1UNIREDOCTOR

K-28: Analysis of the Thermal Behavior of Buriut Fiber: Luana Demostenes1; Sergio Monteiro1; Lucio Nascimento1; Michelle Oliveira1; Fabio Filho1; 1Military Institute Engineering

K-29: Application of Gas Pycnometry for Measurement of Absolute Specific Mass, Open Porosity and Cellulose Content in Mallow Natural Fibers: Lucio Nascimento1; Sérgio Monteiro1; Jheison dos Santos1; Luana Demostenes1; Ulisses Oliveira1; 1Instituto Militar de Engenharia

K-30: Automated Optical Microstructural Characterization of Thermal and Cold Spray Coatings: Satya Ganti1; Elizabeth Jenkins1; William Davis1; Veeraraghavan Sundar1; 1UES Inc

K-31: Ceramic Properties: Clay Smeclite Synthetic: Thamyres de Carvalho1; Camila Maggi1; Margarita Bobadilla1; Edemarino Hidelbrando1; Maria Silva-Valenzuela1; Roberto Neves1; Francisco Valenzuela - Diaz1; Polytechnic School of the University of São Paulo1; 2Federal University of Pará

K-32: Chemical and Instrumental Characterization of a Sulphosalt Lead Type Jamesonita: M. Reyes Perez1; Francisco Barrientos1; Miguel Perez Labra1; Julio Juarez Tapia1; Elia Palacios Beas1; Ivan Reyes Dominguez1; Mizaim Flores Guerrero1; Michell Teja Ruiz1; Carlos Gutiérrez Garcia1; 2

K-33: Characterization of a Composite of High Impact Polystyrene, Pseudoboehmite and Graphene Oxide: Antonio Munhoz1; Caroline Valadão Pacheco1; Henrique Tadeu T. S. Melo1; Renato Meneghetti Peres1; Leonardo Gondim de Andrade1; Leila Figueiredo de Miranda1; Marcos Romero Filho1; 1IPMackenzie; 2UNIGEL; 3EPEN

K-34: Characterization of Antistatic Packaging Based on PET/ rGO: Leila Miranda1; Antonio Munhoz Junior1; Terezinha Masson1; Leonardo Andrade1; Leila Figueiredo de Miranda1; 1University Presbiteriana Mackenzie

K-35: Characterization of Fique Fibers Functional Groups by Infrared Spectroscopy: Artur Campos Pereira1; Sergio Monteiro1; Michelle Oliveira1; Foluke de Assis1; 1Unif Rio De Janeiro1; 2Military Institute of Engineering

K-36: Characterization of Oxides from Al-Mg-Zn Alloys with Heat Treatment, with Scanning Electron Microscopy and Fluorescence Microscopy: Aline Hernández2; Bernardo Campillo1; Sergio Serna1; Álvaro Torres1; Natalia Loera1; 1Facultad de Ingeniería, Universidad Anahuac; 2Facultad de Química, Universidad Nacional Autónoma de México; 3UAEM; 4CENIDET

K-37: Characterization of Printed Circuit Boards of Obsolete (PCBs) Aimed at the Production of Copper Nanoparticles: Thamiris Martins1; Karen Gomes1; Carlos Rosario1; Denise Espinosa1; Jorge Tenório1; 1University of São Paulo; 2Facultad de Oswaldo Cruz

K-38: Comparative Analysis of Dynamic Impact Tests between the Charpy V - Notch Test and the Drop Tower Test: Juan Escobedo-Diaz1; Chaitanya Gunturi1; Md. Islam Ashraful1; 1University of New South Wales

K-39: Comparative Study of the Use of Rice Husk Ashes and Graphite as Fillers in Polypropylene Matrix Composites: Alex Monteiro1; Daili Barreira1; René Oliveira1; Suellen Bartolomei1; Esperidiana Moura1; 1Nuclear & Energy Research Institute

K-40: Development of Biocomposite Materials from Biodegradable Polymer and Bio-hydroxyapatite Derived from Eggshells for Biomedical Applications: Pedro Reis1; Júliana Santana1; René Oliveira1; Vâjaya Lunga1; Felipe Lourenço1; Esperidiana Moura1; 1Inst De Pesquisas Energéticas & Nucleares

K-41: Development of Methodology for the Characterization and Incorporation of Waste from the Paper Industry in Cementitious Materials: Afonso Azevedo1; Jonas Alexandre1; Markssuel Marvilia1; Euzébio Zanolato1; Beatriz Mendes1; Niander Cerqueira1; Sergio Monteiro1; Gustavo Xavier1; Leonardo Pedroti1; Victor Souza1; 1Instituto Federal Fluminense; 2UNEN; 3UFV; 4IME; 1Imed

K-44: Discussion on the Measures of Intelligent Manufacturing: Dongdong Zhou1; Ke Xu1; Peng Zhou1; 1University of Science and Technology Beijing

K-45: Effect of Phosphate Antioxidant on Resisting to Buildups Formation of Carbon Sleeves in Continuous Annealing Furnace for Silicon Steel Production: He Mingheng1; Bowen Li1; Xuecheng Gong1; Jing Zhang1; Wangzhi Zhou1; Jian Xu1; 1R&D Center of Wuhan Iron & Steel Co. Ltd; 2Department of Materials Science and Engineering, Michigan Technological University; 3Siemens Steel Division of Wuhan Iron & Steel Co. Ltd.

K-46: Effect of the Incorporation of Iron Ore Tailings on the Properties of Clay Bricks: Beatriz Mendes1; Leonardo Pedroti1; Rita de Cássia Alvaro1; Raúl Deniz1; Mauricio Paulo Fontes1; Pedro Drumond1; Anderson Pacheco1; Márcia Lopes1; Afonso Azevedo1; 1Federal University of Viçosa; 2State University of Northern Rio de Janeiro

K-47: Effect Study of the Incorporation of the Green Clay Lake in the Polypropylene Homopolymer Properties: Jorge Sales1; Angel Ortiz1; Patricia Poveda1; Francisco R. Valenzuela-Diaz1; Leonardo Souza1; 1Instituto de Pesquisas Energéticas e Nucleares - IPEN-CNEN/SP; 2Universidade de São Paulo, Escola Politécnica, Dep. de Eng. Metalúrgica e de Materiais

K-48: Electron Beam Effect on the Thermal and Mechanical Properties Analysis of DGEBA/EPDM Compound: Anderson Messquita1; Ian Cavalcante1; Leonardo Souza1; 1Instituto De Pesquisas Energéticas E Nucleares - IPEN

K-49: Energy Absorption by Aluminum Foam After Ballistic Impact: Fabio Garcia Filho1; Sergio Monteiro1; Luana Demostenes1; Michelle Oliveira1; 1Military Institute of Engineering

K-50: Evaluation of Technological Properties of Soil-Cement Blocks Using Experimental Design of Mixtures: Afonso Azevedo1; Jonas Alexandre1; Markssuel Marvilia1; Euzébio Zanolato1; Gustavo Xavier1; Niander Aguiar1; Victor Souza1; Thuanney Lima1; Sergio Monteiro1; 1Instituto Federal Fluminense; 2UNEN; 3IME; 1IME
K-51: Evaluation of the Adhesion of Mortar to Substrates by Vertical Loading: Ezebio Zanelato; Jonas Alexandre; Afonso Azevedo; Markssuel Marvila; Sergio Monteiro; Gustavo Xavier; UEFN

K-52: Exploration of Humic as the Binder of Silicon-based Anode for Lithium-ion Batteries: Shuzhen Yong; Guihong Han; Yanfang Huang; Jionglian Liu; Zhengzhou University

K-53: High-resolution Transmission Electron Microscopy of Interfacial Phases at Twin Boundaries in 8 Titanium Alloys: Jian Sun; Shanghai Jiao Tong University

K-54: Impact Response of Bamboo Guadua Angustifolia Kunth: Julian Rua; Mario Buchely; Henry Colorado; Universidad De Antioquia; Missouri University of Science and Technology

K-55: Incorporation of EVA Residue for Production of Lightweight Concrete: Raiza Machado; Luiz Pereira; Ezebio Zanelato; André Manhães; Markssuel Marvila; Afonso Azevedo; Jonas Alexandre; Sergio Monteiro; Lucio Petruzzi; UCAM; UEFN; IME

K-57: Investigation of Equipment Wear Issues in Biomass Pre-processing and Pre-treatment: Jun Ou; James Keeler; Vicki Thompson; Erik Kuhn; Ed Wolfram; Oak Ridge National Laboratory; Idaho National Laboratory; National Renewable Energy Laboratory

K-58: Investigation on Mechanical Behaviors of Polyamide 11 Reinforced with Halloysite Nanotubes: Danae Francisco; Lucilene Paiva; Wagner Aldeia; Ademar Lugao; Esperidiana Moura; Nuclear & Energy Research Institute; Instituto for Technological Research of State of São Paulo, IPT; Instituto for Technological Research of State of São Paulo, IPT

K-59: Magnetic, Mossbauer and Structure Studies of Exchange Bias in Fe304-Gamma-Fe203 Core-Shell Nanoparticles of Fixed Core Diameter and Variable Shell Thicknesses: imaddin Al Omari; I. Obaidat; C. Nayek; K. Manas; G. Bhattacharjee; A. Gismelseed; Sultan Qaboos University; United Arab Emirates University; Max-Planck-Institute for Chemical Physics of Solids; Saha Institute of Nuclear Physics

K-61: Measurement of SnO2 Nanoparticles Coating on Titainum Oxide Nanotube Arrays Using Grazing Incidence X-ray Diffraction: Tong Yunhui; Bo Wang; Hongyi Li; Mingsheng He; Beijing University of Technology; R&D Center of WISCO

K-62: Microstructural and Mechanical Characterization of the Low Carbon Steel Nitrided at Different Conditions: Ariosto Medina; Claudio Aguilar; Luis Béjar; Jesus Valdes; Joaquin Osegueda; Universidad Michoacana de San Nicolas de Hidalgo; Universidad Tecnica Federico Santa Maria; Instituto tecnologico y de Estudios Superiores de Monterrey Campus Estado de Mexico

K-63: Microstructural Characterization of a High Strength Steel Subjected to Localised Blast Loading: Simon Higgins; Ali Ameri; Brodie McDonald; Wayne Hutchinson; Huon Bornstein; Juan Escobedo-Diaz; University of New South Wales; DST-G

K-65: Mining Waste Used as Ceramic Coating on Aluminum Alloy: Maria Lucia Antunes; Carime Souza; Renan Moraes; Eldiliane Rangel; Nilson Cruz; Antonio Munhoz; Sao Paulo State University (UNESP); Mackenzie – Universidade Presbiteriana Mackenzie

K-66: Mortars with Pineapple Fibers for Use in Structural Reinforcement: Markssuel Marvila; Jonas Alexandre; Afonso Azevedo; Ezebio Zanelato; Sergio Monteiro; Daiane Cecchin; Lucas Amaral; Universidade Estadual do Norte Fluminense Darcy Ribeiro; Instituto Militar de Engenharia; UFF

K-67: Multilayered Armor System with Guaranum Fiber Composite: Raphael Reis; Larissa Nunes; Fabio Filho; Sergio Monteiro; IME

K-68: Obtainment and Characterization of Nanocellulose from Sugarcane Bagasse: Marcus Seixas; Esperidiana Moura; Helio Wiebeck; University of Sao Paulo; IPEN

K-69: Performance of Epoxy Matrix Reinforced with Fique Fibers in Pullout Tests: Michelle Oliveira; Artur Campos; Fabio Garcia; Luana Demosthenes; Sergio Monteiro; Militar Institute of Engineering

K-70: Physical Property of Molten Al203 and ZrO2 Measured by Aerodynamic Levitation Technique: Toshiki Kondo; Hiroaki Muta; Ken Kurosaki; Yuki Ohishi; Osaka University

K-71: Production and Characterization of a Hybrid Composite of Polypropylene Reinforced with Piasava (Attalea funifera Martius) Fiber and Light Green Clay Nanocomposites: Sabrina Correia; Pedro Cruz; Tasson Rodrigues; Alex Monteiro; Francisco Valenzuela Diaz; Esperidiana Moura; University of Sao Paulo; Nuclear & Energy Research Institute; Butantan Institute

K-72: Properties of Residual Green Sand and the Possibility of Using It in the Production of Pressed Blocks: Victor Souza; Niander Cerqueira; Lucas Silva; Guilherme Coutinho; Amanda Lima; Centro Universitário Redentor

K-73: Proposal of Dosing of Mortars Using Simplex Network: Markssuel Marvila; Jonas Alexandre; Afonso Azevedo; Ezebio Zanelato; Sergio Monteiro; Niander Cerqueira; Universidad Estadual do Norte Fluminense Darcy Ribeiro; IME

K-74: Recycled Gypsum Particles Incorporation in Recycled Expanded Polystyrene by Biodegradable Solvent – Preparation and Characterization: Suzellen Bartolomei; Esperidiana Moura; Helio Wiebeck; University of Sao Paulo; Nuclear & Energy Research Institute

K-76: Structural Analysis of Sintered Products of BaTiO3 Doped with Sm3+; J.P. Hernández-Lara; Miguel Perez-Labra; C.C. Gutierrez-Hernández; F. R. Barrientos-Hernández; J. A. Romero-Serrano; A. Hernández-Ramirez; M. Reyes-Perez; J. C. Juárez-Tapia; V. E. Reyes-Cruz; UAH Mexico; ESIOIE-IPN Mexico

K-78: Study of the Electrical Properties of rGO obtained by Different GO Reduction Methods: Leila Miranda; Paulo Victor Gomes; Fabio Jesus Almeida; Leonardo Andrade e Silva; Antonio Munhoz Junior; Terezinha Masson; Universidade Presbiteriana Mackenzie; Instituto de Pesquisas Energéticas e Nucleares


K-80: Study on Powder and 3D Printing Properties of 316L Stainless Steel Prepared by Vacuum Gas Atomization: Lihtun Li; Wuhan Iron and Steel Research Inst

K-81: Synthesis and Ferroelectric Properties of BaTiO3-based Ceramics Doped with La3+ by Solid State Route: Barrientos Hernández Francisco Raúl; Pérez Labra Miguel; Juárez Tapia Julio César; Reyes Pérez Martín; Hernández Lara Juan Pablo; Cardoso Legorreta Edgar; Universidad Autónoma del Estado de Hidalgo

K-82: Synthesis and Structural Characterization of Europium Titania (Eu2TiO5): Juan Pablo Hernandez Lara; Miguel Perez Labra; Francisco Raúl Barrientos Hernández; Aurelio Hernández Ramírez; José Antonio Romero Serrano; Martín Reyes Pérez; Julio Cesar Juárez Tapia; A. M. Teja-Ruiz; Aactym-Uaeh; ESIOIE-IPN

K-83: The Comparison of Mechanical Properties on Ni-base Superalloy Casting Alloys for A-USC Power Generation Application: Jaihyun Park; Rist
MATERIALS DESIGN

Computational Materials Design and Discovery — Poster Session

*Sponsored by* TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

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M-12: Electric Properties of Isovalently Substituted Bi2O2Se: A Computational Study

Kerong Hu1; Jian Han2; Ben Xu1

1Tsinghua University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Poster Session

*Sponsored by* TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, University of Florida; Mikhail Mendelev, Ames Laboratory; Avinash Dongare, University of Connecticut

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O-2: Ab Initio Study on the Oxidation Mechanism of Millerite: Xiaolu Xiong1; Xionggang Lu1; Guangshi Li1; Hongwei Cheng1; Qian Xu1; Shenggang Li2; Shanghai University; 2Key Laboratory of Low-Carbon Conversion Science and Engineering, Shanghai Advanced Research Institute, Chinese Academy of Sciences

O-3: Diffusion Kinetics of Vacancy in Hydrogen Environment: First-principles and Molecular Dynamics Modeling and Simulation

Jun-Ping Du1; W. T. Geng2; Kazuto Arakawa3; Shigenobu Ogata2; 1Kyoto University; 2Osaka University; 3Shimane University

O-4: Effect of Substituted Atoms for Stacking Fault Formation in LPSO System: Shoya Kawano1; Satoshi Ikubu1; Kyushu Institute of Technology

O-5: Kinetic Model of Silica Dissolution in CaO-SiO2-MgO-Al2O3 Slag System: Haifei An1; Jie Li1; Aimin Yang1; Weixing Liu1; Can Tian1; 1North China University of Science and Technology

**MATERIALS DESIGN**

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Poster Session

*Sponsored by* TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

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M-5: Efficacy of a Mathematical Model in Mimicking Trabecular Bone Structures Using Deep Learning Techniques

Neda Shafiei1; Joel Gomez2; Edward Guo3; Xiaodu Wang4; UTSA; Columbia University

M-6: Material Parameter Estimation for Phase-field Model of Binary Alloy Solidification Using EnKF-based Data Assimilation

Kazuhi Takahashi1; Akinori Yamanaka1; Kengo Sasaki2; 1Tokyo University of Agriculture and Technology; 2Kozo Keikakun Engineering Inc.

M-8: Prediction of Biaxial Tensile Deformation Behavior of Aluminum Alloy Using Crystal Plasticity Finite Element Method and Machine Learning

Kohta Koenuma1; Akinori Yamanak1; Toshihiko Kuwabara1; 1Tokyo University of Agriculture and Technology

M-9: Sequential Experiments Design for Acceleration the Developments of NiTi-based Shape Memory Alloys

Sen Liu1; Behnam Amin-Ahmadi2; Branden Kappes2; Aaron Stebner2; Xiaoli Zhang2; 1Colorado School of Mines

M-10: Thermocouple Temperature Measurement and Thermal Modelling of Zircaloy-4 during Electron Beam Welding

Lord Nayak1; 1Indian Institute of Technology Kharagpur
M-13: Diffusion in FCC Co-rich Co-Cr-Ni-Ta Alloys: Kil-Won Moon1; M. E. Williams2; C. E. Campbell2; 1National Institute of Standards and Technology; 2University of Florida

M-14: Effects of Cr and Al Additions on the Microstructure and Mechanical Properties of Co-Ti-W Based Alloys: Boryung Yoo2; Hye Ji Im2; Jae-Bok Seol3; Pyuck-Pa Choi4; 1KAIST; 2NINT

M-15: The Effect of Titanium on the Tungsten-free Cobalt-base Superalloys: Semanti Mukhopadhyay5; Prafull Pandey5; Surendra Makineni3; Krishna Biswas4; Kamano Chattopadhyay5; Dierk Raabe6; Baptiste Gaul1; 1Ohio State University; 2Indian Institute of Science; 3Max-Planck-Institut für Eisenforschung GmbH; 4Indian Institute of Technology, Kanpur

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Poster Session

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

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I-43: Artificial Stones from Marble Waste: Ruben Jesus Rodriguez1; Fernanda Souza1; Tcharlis Dimartini1; Carlos E. Ribeiro2; 1Universidade Estadual Do Norte Fluminens E; 2Instituto Federal do Espírito Santo

I-44: Charpy Impact Test of Polymeric Composites with Epoxy Resin Reinforced by Jute Fabric: José Machado1; Juliana Carvalho2; Anna Carolina Neves2; Felipe Lopes3; Sérgio Monteiro2; Carlos Vieira2; 1State University of Northern River of Janeiro; 2Military Engineering Institute

I-45: Development of Silicate Glasses with Granite Waste: Michelle Babisk1; Vinicius Gomes1; Carlos Mauricio Vieira2; Francisco Vidal1; Monica Gadioli1; Juraci Sampaio1; 1State University of Northern Rio de Janeiro

I-46: Evaluation of Feldspathic Rock Waste on the Production of Structural Ceramics with Greater Value Added: Lucas Amarald; Geovana Carla Delaqua1; Micaela Nicolite1; Carlos Mauricio Vieira2; Sérgio Neves2; 1State University of Northern River of Janeiro; 2Military Engineering Institute

I-47: Evaluation of Mechanical, Thermal, and Hydrophobic Properties in Blends before and after the Incorporation of Organic Compound and SiO2: Julio Harada1; Alana Souza1; Daniel Rocha1; Leonardo Silva1; Derval Rosa1; 1UFABC; 2IPEN

I-48: Evaluation of the Mechanical Characteristics of Geopolymerized Ceramic from Granulated Blast Fumace Slag: Kátia Faria1; Carlos Mauricio Fonseca Vieira2; Wesley Macario Ferreira; Marcos Yuri Silva Fagundes1; 1Universidade Estadual Norte Fluminense Darcy Ribeiro

I-49: Flexural Test of Composite Eco-friendly Composites Reinforced by Piassava Fiber: Juliana Carvalho1; Juliana Faria1; Felipe Lopes1; Sérgio Monteiro1; Carlos Vieira1; 1State University of Northern River of Janeiro

I-50: Influence of Eletrofused Alumina Residue on Red Ceramic Properties: Micaela Nicolite1; Lucas Amarald1; Geovana Carla Delaqua1; Fernando Vernilli1; Carlos Mauricio Vieira2; Sérgio Neves2; 1State University of Northern River of Janeiro; 2State University of Sao Paolo; 3Military Engineering Institute

I-51: Izod Impact Testing Composites with Vegetal Polyurethane Matrix Reinforced by Cotton Fabric: Carolina Ribeiro1; Juliana Carvalho1; Felipe Lopes1; Sérgio Monteiro1; Carlos Vieira1; 1State University of Northern River of Janeiro
TMS2019 POSTERS

I-52: Mechanical Resistance of Artificial Stone Composite Using Waste from Fluorescent Lamp Glass in Polymeric Matrix: Lucas Martins; Elaine Carvalho; Carlos Mauricio Vieira; Larissa Ribeiro; 1State University of Northern Rio de Janeiro

I-53: Performance of Natural Curaua Non-woven Fabric Composites as Stand-alone Targets against Standard 9 mm and 7.62 mm Projectiles: Fabio Braga; Michelle Oliveira; Fabio Garcia Filho; Sergio Monteiro; Edio Lima Jr.; 2Faculty of the National Service of Industrial Apprenticeship (SENAI); 3Military Institute of Engineering

I-54: Reuse Of Quarry And Industrial Waste For The Production Of Artificial Ornamental Stones: Carlos Agirizzi; Carlos Mauricio Vieira; Elaine Carvalho; Mônica Gadioli; 1UENF; 2CETEM

I-55: Reuse of Quarry Waste in Artificial Stone Production with using Vacuum, Compression and Vibration: Elaine Carvalho; Juan Peixoto Barroco Magalhães; Ruben Sanchez Rodriguez; Eduardo Carvalho; Sérgio Neves Monteiro; Carlos Mauricio Vieira; 1State University of the Northern Rio de Janeiro; 2IME-Military Engineering Institute

I-56: Reuse of the Iron Ore Residue through the Production of Coating: Elaine Carvalho; Larissa Ribeiro; Maria Luiza Menezes Gomes; Mônica Borlini; Carlos Mauricio Vieira; Sérgio Neves Monteiro; 1State University of the Northern Rio de Janeiro; 2IME-Military Engineering Institute

I-57: Soda-lime Glass Waste Utilization for Red Ceramic Production: Pâmela Buschi; Lucas Amaral; Geovana Carla Dequala; Carlos Mauricio Vieira; Sérgio Neves; 1State University of the Northern Rio de Janeiro; 2IME-Military Engineering Institute

I-58: Study of the Effect of Incorporation of Laminated Flat Glass Waste in a Polymeric Matrix: Maria Luiza Gomes; Juan Peixoto; Elaine Carvalho; Ruben Sanchez Rodriguez; Eduardo Carvalho; Sérgio Neves Monteiro; Carlos Mauricio Vieira; 1State University of the Northern Rio de Janeiro; 2IME-Military Engineering Institute

I-59: Study of the Incorporation of Waste from the Paper Industry in Ceramic Tiles: Afonso Avedo; Beatryz Mendes; Markssuel Marvila; Jonas Alexandre; Euzébio Zanelato; Gustavo Xavier; Niander Cerqueira; Sergio Monteiro; Thuyanny Lima; 1Instituto Federal Fluminense; 2UFV; 3UENF; 4IME

I-60: Study of the Technological Properties of Multiple Mortar use with Efficient Addition of Rock Waste: Micaela Nicotile; Lucas Amaral; Geovana Carla Dequala; Markssuel Marvila; Jonas Alexandre; Carlos Mauricio Vieira; Sérgio Neves; 1State University of the Northern Rio de Janeiro; 2Military Engineering Institute

I-61: Technological Properties of Brick Waste-based Geopolymer: Kátia Faria; Carlos Mauricio Fontes Vieira; Dylmar Dias; Marcos Yuri Silva Fagundes; Wesley Macario Ferreira; 1Universidade Estadual do Norte Fluminense Darcy Ribeiro

I-62: Use of Waste of Ornamental Stone in Ceramic Mass Incorporation in Brazil: Maria Angelica Kramer Sant’Ana Sant’Ana; Mônica Castoldi Borlini Gadioli; Michelle Pereira Babiski; Elaine Carvalho; Carlos Mauricio Vieira; 1Mineral Technology Center; 2State University of the Northern Rio de Janeiro

ADVANCED MATERIALS

High Entropy Alloys VII — Poster Session

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Shirvatsan Tirumalai, The University of Akron

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J-19: A Comparative Study of Critical Pitting Temperature (CPT) of CoCrFeNi and CoCrFeNiMn High Entropy Alloys: Hamid Torbati-Sarrafi; Milta Shabanisamghabady; Garrett J. Pataky; Paul Jablonski; Amir Poursaeed; 1Clemson University; 2National Energy Technology Laboratory


J-21: Calphad Modeling and Microstructure Stability of Novel Refractory High Entropy Alloys NbMoCrTiAl and TaMoCrTiAl: Franz Muellerl; Bronislava Gori; Hans-Jürgen Christl; Hans Chen; Alexander Kauffmannl; Martin Heinmaierl; 1Universität Siegen; 2Karlsruher Institut für Technologie (KIT)

J-22: Combinatorial Screening Approach in Developing Non-equiatomic High Entropy Alloys: Azin Akbaril; Artashes Ter-Isahakyan; T John Baktl; 1University of Kentucky

J-23: Computational Design of High Strength High-entropy Alloys: Won-Mi Cha; Yong Hee Jo; Sunghak Lee; Byeong-Joo Lee; 1Pohang Institute of Science & Technology

J-24: Deformation-induced Amorphization Generates a Novel Serrated Behavior in an FCC Structured High-entropy Alloy: Kaisheng Ming; Xiaofang Bi; Jian Wang; 1University of Nebraska-Lincoln; 2Beihang University

J-25: Effect of Annealing Heat Treatment on Microstructural Evolution and Tensile Behavior of Al0.5CoCrFeMnNi High-entropy Alloy: Jeong Min Park; Jongun Moon; Jae Wung Bae; Jaimyun Jung; Sunghak Lee; Hyoong Seop Kim; 1Pohang University of Science and Technology

J-26: Effect of Composition on Microstructure and Deformation Behavior of Thin Film AlCoCrFeNi-based High-entropy Alloys: Seunghun Nam; Junyeon Hwang; Jaebeom Lee; Jiyoung Kim; Moon Kim; Hyunjoo Choi; 1Kookmin University; 2Korea Institute of Science and Technology; 3The University of Texas at Dallas

J-27: Effect of Stress Triaxiality and Strain Rate on the Failure Behavior of Cr-Mn-Fe-Co-Ni Alloys: JeongWon Yeh; Kook Noh Yoon; Hyun Seok Oh; Sang Jun Kim; Eun Soo Park; 1Seoul National University

J-28: Effects of Ti and Al Additions on Irradiation Behavior of FeMnNiCr Based High Entropy Alloys: Andrew Hoffman; Haiming Wen; Li He; 1Kumar Sridharan; 2Missouri University of Science & Technology; 3University of Wisconsin

J-29: Extreme Stereochimically-driven Magnetic Disorder in Entropy-stabilized Oxides: Peter Meisenheimer; Logan Williams; Emmanuel Kloupakis; John Heron; 1University of Michigan
J-30: Fabrication and Characterization of Non-equatomic AlZnCuFeSi High Entropy Alloy by Mechanical Alloying. Ashutosh Sharma1; Minseok Oh2; Min Chui Oh2; Byungmin Ahn1; 1Ajou University

J-31: First-principles Methods of Investigating Elastic Properties and Stacking Fault Energies in Refractory BCC High-entropy Alloys. Joshua Struther1; Alexandra Scheer2; Chelsey Hargather3; 1New Mexico Institute of Mining & Technology

J-32: First-principles Prediction of AlCo and AlNi Phase Diagrams. Peyman Samimi1; Saurabh Nene1; Subhasis Sinha1; Anil Chandra2; 1New Mexico State University; 2Arizona State University

J-33: High-throughput Experimental Design of High-entropy Alloys: Antoine Hilhorst1; Pierre Bille1; Audrey Favache1; Pascal Jacques3; 1UCLouvin - iMMC

J-35: Investigate the Microstructural Evolution and Mechanical-properties improvement of Two Refractory High-entropy Alloy Systems. Xuesong Fan1; Chanhoo Lee1; Peter Liaw3; 1The University of Tennessee

J-36: Investigation of Interdiffusion in Fe-Ni-Co-Cr-Mn System: Vivek Verma1; Kaustubh Kulkarni2; 1Indian Institute Of Technology Kanpur

J-37: Mechanical Behavior and Phase Evolution in the MnFeCoNiCu High Entropy Alloy System: Benjamin MacDonald1; Zhiqiang Fu1; Lakshmi Sravanani Mantha3; Julia Ivanisenko1; Weiping Chen1; Yizhang Zhou1; Christian Kübel1; Horst Hahn2; Enrique Lavernia1; 1University of California Irvine; 2Karsruhe Institute of Technology; 3South China University of Technology

J-38: Microstructural Evolution and Mechanical Properties of Quaternary AlCoCrNi High Entropy Alloy: Eloyjorn Jumaae1; Ki Buem Kim1; Jin Kyu Lee1; Hyo Soo Lee3; 1Sejong University; 2Kangju National University; 3Korea Institute of Industrial Technology

J-39: Microstructural Evolution of a Transformation Induced Plasticity High Entropy Alloy Upon Friction Stir Processing: Michael Frank1; Saurabh Nene1; Subhasis Sinha2; Kaimiao Liu1; Rajiv Mishra1; Kyu Cho1; Brandon McWilliams3; 1University of North Texas; 3University of California San Diego

J-40: Molecular Dynamics Simulations on the Mechanical Behavior of AlCoCrCu0.5FeNi High-entropy Alloy Nanopillars. Wei Li1; Jing Tang1; Qingyuan Wang1; Haidong Fan1; 1Sichuan University

J-41: On the Characterization of the Exceptional Fracture Toughness of CrMnFeCoNi High Entropy Alloy: Antoine Hilhorst1; Thomas Pardon1; Pascal Jacques3; 1UCLouvin - iMMC

J-42: On the Transformation-induced Plasticity in Non-equatomic FeCoNiCr Medium-entropy Alloys: Jie Wang Bae1; Jaeyun Jung1; Jeong Min Park1; Jung Gi Kim3; Ji Hyun Moon1; Stefanus Harjo1; Hyoung Seop Kim1; 1Center for High Entropy Alloys, Pohang University of Science and Technology (POSTECH); 3Center of Metal Nanomaterials Technology (NINT) POSTECH; 4Japan Proton Accelerator Research Complex

J-43: Orientation and Carbon Content Dependence of Twinning in Single Crystalline FeMnCoCrNi High-entropy Alloys. Sezer Piccah1; Peyman Samimi1; Irina V. Kireeva3; Yuri I. Chumilyakov3; Ibrahim Karaman3; 1Department of Mechanical Engineering, Texas A&M University; 2Department of Materials Science and Engineering, Texas A&M University; 3Tomsk State University, Siberian Physical Technical Institute

J-44: Phase-field Modelling of Transformation Pathway in High-entropy Alloys (HEAs): Kamalnath Kadirev1; Yunzhi Wang1; Hamish Fraser1; Taiwu Yu1; Longsheng Feng1; Jacob Jensen1; 1Ohio State University

J-45: Production and Characterization of Reduced Graphene Oxide/FeNiCoCu High Entropy Alloy Nanocomposites: Serzet Soğalt1; Burak Kucukelyas1; Sebahattin Gürmenn1; 1Istanbul Technical University; 2Bursa Technical University

J-46: Role of Alloying Elements on the Phase Stability and Soft Magnetic Properties of AlFeCoCrm High Entropy Alloys: Chanwon Jung1; Ku Kang1; Amalraj Marshal1; Konda Pradep2; Jae-Bok Seot3; Hyuck Mo Lee4; Pyuck-Pa Choi4; 1Korea Advanced Institute of Science and Technology (KAIST); 2RWTH Aachen University; 3Indian Institute of Technology Madras; 4National Institute for Nanomaterials Technology (NINT) POSTECH

J-47: Si-content-dependent Microstructures and Mechanical Properties of (AlCrTiZrNb)-Six-N High Entropy Films: Lili’ Jingrui Ni1; 1University of Shanghai for Science and Technology

J-48: Study of Serrated Plastic Deformation of Equiatomic CoCrFeMnNi at Cryogenic Temperatures: Aditya Srivinasa Tirumalai1; Jan Sas1; Klaus-Peter Weiss2; Hans Chen1; David Geissler1; Jens Freudenberg1; Martin Heilmayer1; Alexander Kauffmann1; 1Institute for Applied Materials, Karsruhe Institute of Technology; 2Institute for Technical Physics, Karlsruhe Institute of Technology; 3Leibniz Institute for Solid State and Materials Research Dresden; 4Leibniz Institute for Solid State and Materials Research Dresden

J-49: The Effects of Minor Alloying Elements on the He Bubble Formation Resistance of FeCoNiCr-based High-entropy Alloys: Da Chen1; Yang Tong1; Bin Han2; Yilu Zhao2; Jing-Jung Kao2; 1City University of Hong Kong; 2City University of Hong Kong; National Tsing-Hua University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics

III — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmoltz-Zentrum Geesthacht; Siddhartha Pathak, National Institute for Science and Technology, Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

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N-29: Application of Small Scale Mechanical Testing to Link Interface Properties to Macroscopic Hysteresis Behavior of SiC/SiC Composites: Joseph Kabel1; Darren Parkison2; Christian Deck2; Yutai Katoh3; Peter Houseman3; 1University of California, Berkeley; 2General Atomics; 3Oak Ridge National Laboratory

N-31: Atomic Study of the Graphene Nanobubbles: Petr Zihlaev1; Evgeny lakovlev1; Iskander Akhatov1; 1Skolkovo Institute for Science and Technology

N-32: Characterization of Microstructure Instability in Ultra-fine Grained Aluminum Films via In-situ TEM Deformation with Automated Crystal Orientation Mapping (ACOM): Benjamin Shaffer1; E Izadi1; Saul Opie1; Vikram Bathalia1; Jagannath Rajagopalan1; Pedro Peralta1; 1Arizona State University

N-33: Creep of Freestanding Nanocrystalline NiW Thin Films using an Innovative MEMs Test Platform: Ryan Pocratsky1; Longchang Ni1; Maarten de Boer2; 1Carnegie Mellon University

N-34: Deformation Mechanisms of Nanocrystalline Cu-Ta Alloys: Raj K. Koj1; Kiran Solanki2; Kris A. Darling3; Yuri Mishin3; 1George Mason University; 2Arizona State University; 3U.S. Army Research Laboratory
N-35: Effect of Imperfections on the Energetic and Mechanical Characteristics of Semi-coherent Interfaces: Mohammad Dodaran; Doret Moldovan; Wenjin Meng; Shuai Shao; 1Louisiana State University

N-36: Effect of Orientation, Interface Structure, and Interface Chemistry on the Mechanical Response of Pearlite: Matthew Guziewski; Shawn Coleman; Christopher Weinberger; 2U.S. Army Research Laboratory; 2Colorado State University

N-37: Engineering Metal-MAX Multilayered Nanocomposites: Hierarchical Microstructures for Tunable Strength and Toughness: Siddhartha Pathak; Garritt Tucker; 1University of Nevada, Reno; 1Colorado School of Mines

N-38: Investigating the Local Fatigue Properties of Materials and Interfaces in Small Dimensions by Dynamic Micropillar Compression: Benoit Merle; 1University Erlangen-Nürnberg

N-39: Investigating the Thermo-mechanical Stability of Grain Boundaries in Nanocrystalline Alloys: Ankitt Gupta; Gregory Thompson; Garritt Tucker; 1Colorado School of Mines; 1University of Alabama

N-40: Investigation of Metal/Ceramic Interface Toughness for Design of Novel Material: Meeva Cottura; Mark Asta; 1University of California, Berkeley & Institute Jean Lamour; 2University of California, Berkeley

N-41: Magnetic Flux Trapping at Grain Boundaries in Niobium: A First-principles Study: Puilit Garg; Lance Cooley; Thomas Bieler; Kiran Solanki; 1Arizona State University; 2Florida State University; 3Michigan State University

N-42: Mechanical Behavior of Nanotwinned Metals under Micropillar Compression: An In Situ Study: Jin Li; Tongjun Niu; Jie Ding; Jaehun Cho; Sichuang Xue; Zhe Fan; Yifan Zhang; Haiyan Wang; Xinghang Zhang; 1Purdue University

N-43: Probing the Friction Behavior of BCC Metals: Adam Hinkle; John Curry; Andrew Kustas; Nicolas Argibay; Michael Chandross; 1Sandia National Laboratory

N-44: Qualitative Analysis and Modelling of Deformation in Proton Irradiated Nanocrystalline Copper Tantalum Alloy: Priyam Pathi; Yaqiao Wu; Janelle Wharry; 1Purdue University; 2Boise State University, Centre for Advanced Energy Studies

N-45: Role of Nanocrystalline Interfaces on the Shock Response and Spall Failure of nanocrystalline nanocomposite Al-Si Systems at the Atomic Scales: Sumit Suresh; Marco Echeverria; Avinash Dongare; 1University of Connecticut

N-46: Tensile Deformation Behavior and Inelastic Strain Recovery in Cu/Co Nanolaminates: Rohit Beria; Jagannathan Rajagopal; 1Arizona State University

N-47: Texture Evolution in Accumulative Rolled Bonded Mg-Nb Composites from Polycrystal to Single Crystal Layers: Daniel Savage; Irene Beyerlein; Rodney McCabe; John Carpenter; Nathan Mara; Sven Vogel; Nan Li; Marko Knezevic; 1University of New Hampshire; 2University of California, Santa Barbara; 3Los Alamos National Laboratory; 4University of Minnesota, Minneapolis

N-48: Thermal Stability of Metal-Polymer Interfaces: Barbara Putz; Christoph Gammer; Megan Cordill; 1Erich Schmid Institute for Materials Science

N-49: Tuning the Mechanical Behaviour of Nanocrystalline Austenitic Steel by Proton Irradiation: Markus Alferidh; Peter Hosemann; Daniel Kienert; 1University of Leoben; 2University of California, Berkeley

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California: Afroz Barnoush, Norwegian University of Science and Technology: Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian National Science and Technology Organization

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N-50: Thermal Stability of Metal-Polymer Interfaces: Barbara Putz; Christoph Gammer; Megan Cordill; 1Erich Schmid Institute for Materials Science

N-51: Tuning the Mechanical Behaviour of Nanocrystalline Austenitic Steel by Proton Irradiation: Markus Alferidh; Peter Hosemann; Daniel Kienert; 1University of Leoben; 2University of California, Berkeley

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

M-16: Multiscale Modeling of Graphene Nanobubbles: Evgeny Iakovlev; Petr Zhilyaev; Iskander Akhatov; 1Skolkovo Institute of Science and Technology

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M-17: Multiscale Modeling of Graphene Nanobubbles: Evgeny Iakovlev; Petr Zhilyaev; Iskander Akhatov; 1Skolkovo Institute of Science and Technology

N-52: Mechanical Behavior of Flash-sintered Yttria Stabilized Zirconia via In Situ Microcompression Tests at Elevated Temperatures: Xinghang Zhang; Jaehun Cho; Amiya Mukherjee; R. Garcia; Haiyan Wang; 1Purdue University

NANOARCHITECTURED AND MORPHOLOGY-CONTROLLED NANOPOROUS MATERIALS — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

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N-53: Controllable Metal Nanostructures by Thermoplastic Drawing of Metallic Glasses: Zhonglue Hu; Golden Kumar; 1Texas Tech University

N-54: High-performance Hybrid Electrode Decorated by Well-aligned Nanograss Arrays for Glucose Sensing: Rui Li; Xiongjin Liu; Hui Wang; Yuan Wu; Zhaoping Lu; 1University of Science and Technology, Beijing
O-7: Compositional Effects on Secondary Phases in Al Alloy Powders: Kyle Fitzpatrick-Schmidt1; Victor Champagne2; Danielle Cote1; 1Worcester Polytechnic Institute; 2US Army Research Laboratory

O-8: Corner Instability in Single Crystalline Thin Film: A Phase Field Study: Miral Verma1; Rajdip Mukherjee1; 1Indian Institute of Technology Kanpur

O-9: Determination of Phase Transformations and Microstructure Evolution of Zr-based Alloys During Thermal Processing: Clinique Brundidge1; John Seidensticker1; Linda Rishel1; Tyler Tenku1; 1Naval Nuclear Laboratory

O-10: Development of an Optimized Castable Nanostructured Alloy: Tim Graening1; Lizhen Tan1; Ying Yang1; Yutai Katoh1; 1Karlsruhe Institute of Technology; 2Oak Ridge National Laboratory

O-11: Effect of Cooling Rate of Pb-2.75b Alloys on Microstructural Parameters and Corrosion Resistance in Salt Water: Quentin Boyadjian1; Pascal Paillard1; 1Institut des Matériaux Jean Rouxel (Nantes)

O-12: Effect of Phosphorus on the Phase Stability of γ- Ni–base Superalloy: Linhan Li1; 1Illinois Institute of Technology

O-13: Effect of Sm Content and Solidification Rate on Microstructure of SmFe Alloy: Kun Liu1; Yunli Feng1; Chunyan Song1; 1North China University of Science and Technology

O-14: Enhanced Precipitation of Dispersoids and Age Hardening Precipitates in Aluminium Alloys by Cd Addition: Yanjun Li1; Feng Qian1; Dongdong Zhao1; Shengbao Jin1; Eva Mertsell1; Calin Marioloiu1; Sigmund Andersen1; Gang Sha1; 1Norwegian University of Science and Technology; 2Namng University of Science and Technology; 3SIETEF Materials and Chemistry

O-15: Eutectic Microstructures in Dilute Al-Ce and Al-Co Alloys: Yu Sun1; Cain Hung1; Rainer Hebert1; Mark Aindow1; 1University of Connecticut

O-16: Evaluation of Microstructural Instability at Interface of HIP Bonded Single Crystal and Polycrystalline Nickel Superalloys: Benjamin Georgina; Hamish Fraser1; 1Ohio State University

O-17: Evolution of Dendritic Morphology under HPMO Treatment: Huicheng Li1; Yuxiang Liu1; Qijie Zhai1; 1Shanghai University

O-18: Fabrication and Characterization of (111)-Oriented and Nanotwinned Cu by Periodic Reverse Electrodeposition: Kuan-Ju Chen1; 1National Chiao Tung University

O-19: Influence of Elastic Stresses on the Homogeneous Precipitation Mechanisms in the Cu-Fe System: Manon Bonvait1; Xavier Sauvage2; Didier Blavette2; 1KTH Royal Institute of Technology; 2CNRS - GPM - University Rouen Normandy

O-20: Influence of Local Lattice-level Covalent Character on Diffusion and Precipitation in a Highly Creep-resistant Mg-Nd-Zn Alloy: Deep Choudhuri1; S Srinivasan1; M Gibson2; Y Zheng2; H Fraser1; 1University of North Texas; 2University of North Texas

O-21: In-situ Observation of Melting and Phase Transformation in Duplex Stainless Steel: Yang Liu1; Yanhui Sun1; 1University of Science and Technology Beijing

O-22: Large Scale Field Crystal Simulation of Polycrystalline Grain Growth using GPU Supercomputer: Akinori Yamada1; 1Tokyo University of Agriculture And Technology

O-23: Mesoscale Modeling of Recrystallization and Grain Growth in Two-phase Alloys: Mohammad Abdoolatef1; Fergany Badry1; Karim Ahmed1; 1Texas A&M University

O-24: Microstructural Evolution in An Aluminum-copper System Processed by High-pressure Torsion: Guangyu Liang1; Jae-Kyung Han1; Terence Langdon1; Megumi Kawasaki1; 1Oregon State University; 2University of Southampton

O-25: Microstructural Evolution of a Transformation in Which There Is an Exclusion Zone around Each Nucleus: Paulo Rios1; Harison Ventura1; Andre Alves1; Wesley Assis1; Elena Villa1; 1Universidade Federal Fluminense; 2University of Milan

O-26: Microstructure and Properties in Sputtered Beta Ta Thin Films: Shefford Baker1; Elizabeth Ellis1; Shangchen Han1; Markus Chmielus1; 1Cornell University; 2University of Pittsburgh

O-29: Predicting the Effect of Crystallography on the Performance of High Temperature Shape Memory Alloys Subjected to Viscoplastic Deformations: Pawan Chaugule1; Jean-Briac Le Graverend1; 1Texas A&M University

O-30: Prediction of Isothermal Phase Transformation Kinetics using Continuous Cooling Data: Jeong Min Kim1; Jae-Hyeok Shim1; Kyung Jong Lee1; 1Hanyang University; 2Korea Institute of Science and Technology

O-31: Recovery Softening of Cryogenically Deformed AlMg and AlMgSi Alloys: Belinda Gruber1; Florian Grabner1; Thomas Kremmer1; Stefan Kirstötter1; Florian Speckermann1; Robin Schäublin1; Peter Uggowitzer1; Stefan Pogatscher1; 1Montanuniversitaet Leoben; 2Leichtmetallkompetenzzentrum Ranshofen GmbH; 3AMAG Rolling GmbH; 4ETH Zürich

O-32: Size Effects on Hysteresis in Electrochemically Deposited Thick Film NiMnSn Heusler Alloys: Yijia Zhang1; Julia Billman1; Patrick Shamberger1; 1Texas A&M University

O-33: Strain Induced Orientation Morphology and Kinetics Behaviors of Nanoscale Phase in FeCr Alloys: Yongsheng Li1; Shujing Shi1; 1Nanjing University of Science and Technology

O-34: Study on Microstructure and Properties of Heat Affected Zone in Titanium Microalloyed Steel: Mujun Long1; Jingjun Zhao1; Qinzheng Wang1; Junsheng Cao1; Dengfu Chen1; Huamei Duan1; Shixin Wu1; Tao Liu1; 1Chongqing University
O-35: Synthesis, Microstructure and Mechanical Properties of Ti/Al Multi-layered Composites with the Hierarchical Structure: Xiong Wan1; Yanjin Xu2; Baoshuai Han2; Weizhao Sun1; Tao Jing3; 1Tsinghua University; 2AVIC Manufacturing Technology Institute, Beijing

O-36: Synthesis of Intermetallic-based Aluminum Matrix Nanocomposites through High-pressure Torsion: Jae-Kyung Han2; Dong-Hyun Lee2; Jae-ill Jang3; Terence Langdon3; Megumi Kawasaki3; 2Oregon State University; 3Max-Planck-Institut für Eisenforschung GmbH; 2Hanyang University; 2University of Southampton

O-37: The Effect of Temperature on the Suppression of Twinning in A-axis Textured Magnesium and Magnesium Alloys: Roshan Palamthottam1; Steven Lavenstein1; Suhas Eswarappa1; Prameela1; Tim Wehls2; Jaafar El-Awady3; 1Johns Hopkins University

O-39: Thermo-mechanical Simulation of Solid-state Welding in Ti-17: Samuel Kuhn1; Gopal Viswanathan1; Thomas Broderick2; Hamish Fraser1; 1Ohio State University; 2GE Aviation

O-40: Thermodynamic Properties of Si-B Alloys Determined by Solid State Heterogeneous Phase Equilibrium: Muhammad Imam1; Ramana Reddy1; 1University of Alabama

O-41: Titanium Oxidation Under Low Partial Pressures of Oxygen: Mayela Aldaz-Cervantes1; Paul Rottmann1; N.S. Harsha Gunda1; Anton Van der Ven1; Carlos Levi1; 1University of California, Santa Barbara

O-42: Transformation Kinetics in Zircaloy-4 Weldments: Sarah Baker1; Andrew Moffat1; Helen Taylor1; 1Frazer-Nash Consultancy; 1Rolls-Royce plc

O-43: Twin-mediated FCC to B2 Transformations in a Fcc-based Complex Concentrated Alloy: Deep Choudhuri1; Rajarshi Banerjee1; Rajiv Mishra1; 1University of North Texas

O-44: Twinning in Micro and Nanoscale Pillars – Size Effect in Cu–Ni–Al Shape Memory Alloy: Marek Vonk1; Miroslav Karlík2; Jozef Veselý2; Jan Manák1; Oleg Heczko1; 1Institute of Physics of the Czech Academy of Sciences; 2Czech Technical University; 2Charles University

O-45: X-ray Tomography Study of Wire Size Effect on Kirkendall Pore Evolution in Ti-coated Nickel Wires: Arun Bhattacharjoe1; Ajith Achuthanukuttty1; Aaron Yost2; Dinc Erdemiz1; David Dunand1; Ashley Paz y Puente1; 1University of Cincinnati; 1Northwestern University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Poster Session

Sponsored by: TMS Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

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N-58: Densification Behavior and Mechanism of an EP741NP Superalloy by Hot Pressing: Yuan Yuan1; Xiaoyun Feng1; Lianxi Hu1; 1Harbin Institute of Technology

N-59: Effects of Si Addition on Microstructure and Mechanical Properties of the Sintered Al-Cr-Si Alloy by using Gas-atomization and Spark Plasma Sintering: Hyeon-Tae Son1; Yong-Ho Kim1; Hyo-Sang Yoo1; 1Korea Institute of Industrial Technology

N-60: Fabrication and Mechanical Property of Binder Free WC and WC-Co Hard Materials for a Cutting Tool Application by Pulsed Current Activated Sintering Method: Jeong Han Lee1; Hyun-Kuk Park1; Jun-Ho Jang1; Sung-Kil Hong2; Ik-Hyun Oh1; 1Korea Institute of Industrial Technology; 2Chonnam National University

N-61: Powder Properties of High-entropy Alloys Powders Fabricated by Rapid Solidification Process: Kwang Yong Jeong1; Soon Jik Hong1; Chul Hee Lee3; Su Sung Ahn3; Hyeon Jeong You1; 1Kong Ju National University

N-62: Property Evaluation and Thermal Conductivity of Cu-flake Graphite Material Composite use of Electroless Plating and Pulse Current Activated Sintering Process: Junho Jang2; Ik-Hyun Oh1; Hyun-Kuk Park1; Jeong-han Lee1; Jae-won Lim1; 1Korea Institute of Industrial Technology; 2Jeonbuk University

N-63: The Influence of Mechanical Activation on the Synthesis of Ca2MgSi2O7: Fariborz Tavangarian1; Caleb Zolko1; 1Pennsylvania State University

N-64: Ultrafine Grained AZ61Mg/Ti Composite with High Mechanical Strength: Lianxi Hu1; Huan Yu1; Yu Sun1; 1Harbin Institute of Technology

ENERGY & ENVIRONMENT

REWAS 2019: Rethinking Production — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division. TMS. Recycling and Environmental Technologies Committee

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Gabrielle Gaustad, Alfred University; Elsa Olivetti, Massachusetts Institute of Technology

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Session Chair: Fiseha Tesfaye, Åbo Akademi University

I-1: Degradation of Ore Colector with Photo-Oxidation UV/ H2O2 and Photo-Fenton: Isabela Alves1; Marcela Baltazar2; Denise Espinosa3; Jorge Tenório1; 1University of São Paulo

I-2: Influence of Metallic Impurities on Solvent Extraction of Cobalt and Nickel from a Laterite Waste Liquor: Paula Aliprandini1; Mônica Jimenez Correa1; Jorge Tenório1; Denise Espinosa3; 1University of São Paulo

I-4: Isolation of Cyanide-degrading Bacteria from Cassava-processing Effluent: Amzy Vallenas-Arévalo1; Carlos Rosario2; Marcela Baltazar1; Denise Espinosa3; Jorge Tenório1; 1University of São Paulo
**ENERGY & ENVIRONMENT**

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

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**Session Chair:** Fiseha Tesfaye, Åbo Akademi University

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I-5: Concentration of a Synthetic Solution Containing Cobalt (II), Manganese (II) and Chromium (III) from Nickel Laterite Processing Using Ion Exchange Membrane Electrolysis: Gustavo Fajardo¹, Tatiana Scarazzato²; Jorge Tenório³, Denise Espinosa⁴; ¹University of São Paulo, Polytechnic School

I-7: Distribution and Chemical Species of Chromium in the EAF Dust from Stainless Steel Plant: Zhi Li¹; Guojun Ma¹; Xiang Zhang¹; ¹Wuhan University of Science and Technology

I-8: Effect of Bentonite on the Stabilization and Mechanical Strength of Bricks Made of Peruvian Electric Arc Furnace Dus: Mery Gómez-Marroquin¹; ¹Universidad Nacional de Ingenieria

I-9: Effect of Coal Ratio on Preparation of Si-Ti-Fe Alloy by Carbothermic Reduction with Coal Fly Ash: Kun Wang¹; Yan Liu¹; Song Qi¹; Jun Hao¹; Zhi-he Dou¹; Li-ping Niu¹; Zhang Tingan¹; ¹Northeastern University

I-10: Effect of Contact Time on the Recovery of Metals from the Mining Effluent of Lateritic Nickel by Chelating Resin Dowex XUS43605: Isadora Perez¹; Jorge Alberto Tenério²; Denise Espinosa³; ¹Galo Antonio Carrillo Le Roux

I-11: Experimental Study on Phosphorus Vaporization for Converter Slag by SiC Reduction: Xie Yuelou¹; Shuhuan Wang¹; Dingguo Zhao¹; Chenxiao Li¹; ¹North China University of Science and Technology

I-12: Process of Removing Arsenic from Copper Smelted Acid: Sun Lifu¹; ¹Kunming University of Science and Technology

I-14: Research on Mechanism of Residual Iron Oxides in Preparation of Tailings Glass Ceramics: Jing Li¹; Lian Ying Xu¹; Qi Wang¹; ¹University of Science & Technology Liaoning

I-15: Research on Thermogravimetric-differential Scanning Calorimetric of Spent Lithium Iron Phosphate Batteries Cathode Plate: Yafei Jie¹; ¹Central South University

I-16: Structural Polymer Foams Prepared from Paper Mill Sludge Cellulose Nanofibers and Poly Vinyl Alcohol by Crosslinking Using Directional Freezing: Cynthia Adhu¹; Mark Jolly¹; ¹Cranfield University

I-17: Study of Precursor Preparation of Battery Grade Lithium Iron Phosphate: Li-li Zhang¹; Ting-an Zhang³; Wei-guang Zhang¹; ¹Northeastern University

I-18: Study on Vacuum Pyrolysis Process of Cathode Sheets from Spent Lithium Ion Batteries: Weilun Li¹; ¹Central South University

I-19: Synthesis of CuNP’s on A304 SS from E-wastes: Perla Trejo Bustillos¹; Pedro Ramirez Ortega¹; Mauricio Islas Hernández¹; Laura García Hernández¹; ¹Universidad Tecnologica De Tulancingo

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**ELECTRONIC MATERIALS**

Solar Cell Silicon — Poster Session

**Sponsored by:** TMS: Materials Characterization Committee

**Program Organizers:** Shadia Ikhmayles, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

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L-14: Effect of Sodium Salt Addition in CaO-SiO2 Slag System on Separation and Purification of Silicon Kerf: Jijun Wu¹; Wenhui Ma¹; ¹Kunming University of Science & Technology

L-15: Shape Control of Silver Particles Electrochemically Recovered from Crystalline Silicon Solar Cell by Changing Current Density: Jun-Kyu Lee¹; Jin-Seok Lee¹; Young-Soo Ahn¹; Gi-Hwan Kang¹; ¹Korea Institute of Energy Research
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